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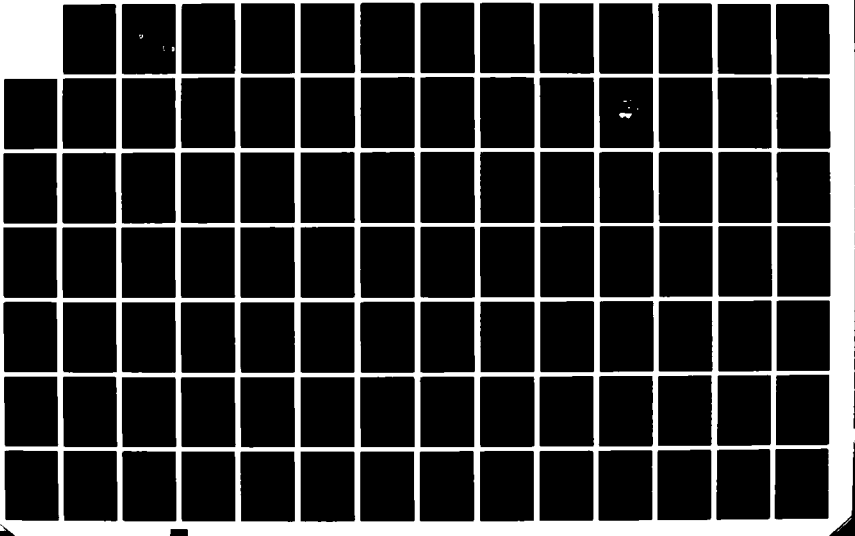

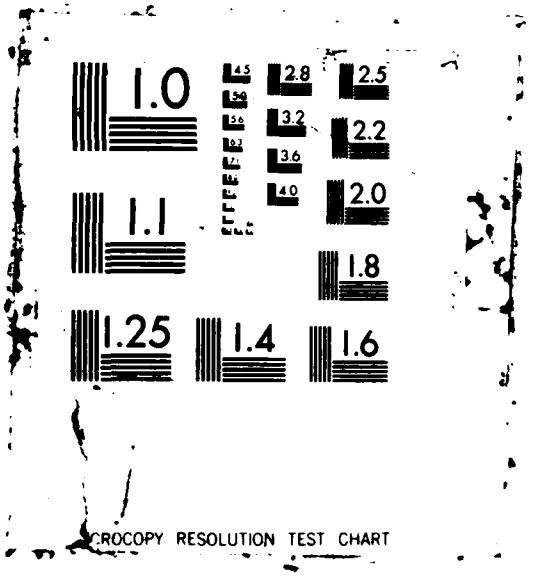
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GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING, 3rd Edition Volume II

A. D. Schwope, P. P. Costas, J. O. Jackson, J. O. Stull, and D. J. Weitzman

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16. Abstract

A variety of protective clothing items are commercially available for emergency response and other applications where chemical hazards may be encountered. Data and information for selecting chemical protective clothing is either not available or is inconsistant from source to source. In 1983, the U. S. Environmental Protection Agency sponsored the development of chemical protective clothing selection guidelines to assist their own Office of Health and Safety in providing guidance to personnel, primarily EPA employees and contractors, working on hazardous waste sites. These guidelines allowed a user to select an 'appropriate' protective material for a specific chemical, select a clothing item (glove, suit, etc.), and then determine which manufacturers offered the clothing item in the recommended material.

The U. S, Coast Guard Office of Research and Development and the EPA have supplemented these guidelines with additional data on material chemical resistance, material physical properties, clothing design features, and specific vendor products. A chapter has been added for selecting chemical protective suits. These guidelines contain data for over 750 chemicals and 700 clothing products. Volume I provides performance information and recommendations for selecting different types of protective clothing. Volume II contains a detailed technical discussion, and the data on which Volume I recommendations are based. The U. S. Coast Guard intends to use these guidelines for protective clothing selection by its National Strike Force and Marine Safety Offices.

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Volume II: Technical and Reference Manual

Guidelines for the Selection of Chemical Protective Clothing

3rd Edition

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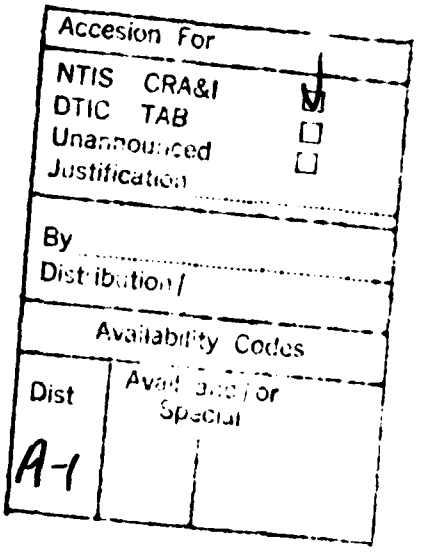

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Arthur D. Little, Inc., prepared this document with what it believes is the best currently available information. The document is subject to revision as additional knowledge and experience are gained. Arthur D. Little cannot guarantee the accuracy of information used to develop the chemical protective clothing recommendations contained herein, and the mention of company names or products does not constitute endorsement by Arthur D. Little. Arthur D. Little accepts no responsibility for damages or liabilities of any kind which may be claimed to result from the use of this document.

ACKNOWLEDGEMENTS

This *Guidelines for the Selection of Chemical Protective Clothing* was prepared by Arthur D. Little, Inc. (Cambridge, Massachusetts), under subcontract to Los Alamos National Laboratory (New Mexico) for the U.S. Environmental Protection Agency (EPA) and the U.S. Coast Guard. Particularly helpful in the preparation of this, the third edition of the *Guidelines* were J.F. Stampfer and H.J. Ettinger (Los Alamos National Laboratory) and Krister Forsberg. Mr. Forsberg of the Royal Institute of Technology (Stockholm) reviewed each line of data presented in Appendix A of Volume II for consistency with the original literature sources. We also thank Dr. Douglas Walters of the National Toxicology Program for contributing an extensive compilation of glove permeation data generated for the NTP by the Radian Corporation.

The text, except for the addition of Chapter 5--Full-Body Protection to Volume I, remains essentially the same (although updated) as the first EPA and ACGIH editions for which we note the support and review comments of W. Aaroe, B.E. Benson, S.P. Berandinelli, R. Ellis, E.R. Hoyle, K. Hunninen, R.F. Kent, W.F. Keffer, A.P. Nielson, R.C. Magor, M.D. Royer, A. Smith, R.S. Stricoff, F. Thompson, R.D. Turpin, L. Walz, and R.W. Weeks. In addition, we appreciate the assistance of encapsulating ensemble manufacturers in the preparation of Appendix G of Volume I.

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SPECIAL NOTE TO USERS

This document contains comprehensive tables of recommendations to aid and facilitate the selection of chemical protective clothing (CPC). The recommendations are based on an extensive compilation and analysis of CPC vendors' literature and experimental test data published in technical journals and reports. It is imperative that users of the recommendation tables familiarize themselves with the background information that precedes and accompanies the tables. The selection of CPC must take into account the potential hazard and the conditions of use--neither is considered in this document. The recommendations are *not* nor do they imply a guarantee of safety.

Although every effort has been made to prepare this document as accurately as possible, errors can and do occur. Users of this document are asked to notify Lt. Jeffrey O. Stull, Commandant (G-DMT-3), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593 (202-267-0853), or Mr. David Weitzman, U.S. Environmental Protection Agency, Office of Occupational Health and Safety, Room 3503, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460 (202-382-3647) of errors so that they can be corrected.

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CHAPTER 1

OBJECTIVES, LIMITATIONS, AND ASSUMPTIONS FOR THE GUIDELINES

A. INTRODUCTION

The selection of the best chemical protective clothing (CPC) for use against a particular chemical can be a difficult and perplexing task. A principal reason for this situation is that the necessary information, if any is available, has not been organized. Vendors' recommendations tables provide guidance but there is little or no basis on which to compare products. Technical reports of CPC performance have increased in number in recent years, but are scattered through the literature, and again, there is no standard format for reporting data.

The EPA's Occupational Health and Safety staff has repeatedly faced this situation in its attempts to provide guidance to field personnel involved in the clean-up of hazardous waste sites. Furthermore, the U.S. Coast Guard has particular needs for consolidating information on full-body protective ensembles. We, therefore, have developed this two-volume *Guidelines for the Selection of Chemical Protective Clothing*. This third edition of the *Guidelines* has been completely updated from those of 1983 and 1985. The key objectives, limitations, assumptions, and instructions for use of this publication are described in the following paragraphs.

B. OBJECTIVES

The main objective of the *Guidelines* is that it be a concise, up-to-date source for information relative to selection of personal protective clothing. Its principal focus is clothing for protection against chemicals which are potentially harmful to humans. More specifically, the *Guidelines* addresses the chemical resistance of protective clothing materials and the design features of full-body protective ensembles and splash suits. The *Guidelines* is designed to:

- Educate (or review for) the user the technical concepts associated with the chemical resistant clothing. The goal is to provide the *Guidelines* user the background necessary to make the best possible decisions relative to selecting and using CPC.

- Bring together and compare the considerable amount of vendors' chemical resistance information with data published in the technical literature pertinent to CPC performance. The goal is to provide consensus recommendations as to the most appropriate clothing for the chemicals of interest.

- Provide listings of CPC products and a directory of CPC vendors.
- Provide specific, detailed information on full-body protective clothing.
- Aid further study of CPC by inclusion of a comprehensive reference listing.
- Be readily updateable as more information becomes available.

C. LIMITATIONS

The scope of the *Guidelines* is limited to gloves, garments, boots, and lenses and face shields. Respirators are not covered. The chemicals are principally liquids, but a small number of gases and some solids with high vapor pressures are included. The chemicals were selected from the listings of Clean Water Act (CWA) Sections 311 and 307a, Clean Air Act (CAA) Section 112, and Resource Conservation and Recovery Act (RCRA) Sections P, U, F, and K. Also addressed were any other chemicals for which there were CPC manufacturers' or vendors' recommendations or technical reports of permeation or compatibility test results.

Regarding the CPC manufacturers and vendors referred to in the directory, the listing is not all inclusive. The objective, however, is to include at least one source for any given item of CPC. In other words, it is unlikely that all distributors of certain brands/lines of CPC are mentioned. The listing is designed such that it can be readily expanded to cover additional manufacturers or distributors as they become known.

The recommendations, which compose Matrices A and B, Volume I, Chapter 8, are the result of comparative analysis of both the vendors' and technical literature in combination with technical judgment. For many chemicals the information available was sufficient for there to be a high level of confidence in the recommendations; these recommendations are listed as double upper case letters in the Matrices. For other chemicals there was less information and the recommendations are listed in lower case. For many chemicals there was no information and no recommendation is given.

A further limitation is that the *Guidelines* does not address multi-component solutions in-depth. Such mixtures, especially where several organic solvents are involved can have greater permeation than any one of the components alone. Special care must be taken when solutions are involved. Furthermore, the *Guidelines* does not consider all the possible applications to which CPC will be put.

D. ASSUMPTIONS

The *Guidelines* is developed under three key assumptions:

- Its users would have a background in the physical sciences and, specifically, chemistry.
- Its users would have some information about the identity of the chemicals to which the CPC may be exposed.
- Its users would have some information about the degree of hazard with which the worker may be faced. The *Guidelines* provides ratings of the expected performance of the materials of construction of CPC. The *Guidelines* does not prescribe the level of clothing necessary for a given task, although Appendix I of Volume I provides some assistance in this regard.

E. INSTRUCTIONS FOR GUIDELINES USE

The *Guidelines* is divided into two volumes. Volume I is directed more towards day-to-day field use, while Volume II is designed more as a reference manual. The individual responsible for selecting CPC at the hazardous waste site should be familiar with all aspects of Volume I. It provides:

- Basic discussions of chemical resistance and permeation of CPC materials.
- Recommendations for CPC for 509 chemicals or aqueous solutions.
- Detailed descriptions of full-body encapsulating ensembles.
- Sources for acquisition of recommended clothing.

The responsible on-site individual should also be aware of Volume II and its contents. Volume II, however, was designed principally to be used by the occupational health and safety professional providing further guidance to field personnel.

The volumes are in loose-leaf format to allow for rapid update in response to additional information on CPC performance and user comments. In this regard, all *Guidelines* users are asked to inform Lt. Jeffrey O. Stull, Commandant (G-DMT-3), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593 (202-267-0853), or Mr. David Weitzman, U.S. Environmental Protection Agency, Office of Occupational Health and Safety, Room 3503, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460 (202-382-3647) of problems in understanding or using the *Guidelines*.

CHAPTER 2

PERMEATION THEORY

A. INTRODUCTION

The purpose of the *Guidelines* is to facilitate the selection of CPC on the basis of its effectiveness as a barrier to potentially hazardous chemicals. Since chemical resistance is the focus, it is appropriate to include a discussion of permeation theory. In Chapter 3, Volume I, a brief overview of the key aspects of the theory is presented. The present chapter contains a more in-depth discussion of the subject. In addition several other theoretical factors which were considered in developing the CPC recommendations are summarized.

B. IDEAL PERMEATION

Permeation of a chemical through a barrier is a three-step transport process involving (1) the sorption of molecules of the chemical at the contacted surface of the barrier, (2) the diffusion of the sorbed molecules through the barrier, and (3) the desorption of the molecules from the opposite surface of the barrier.[83],[84] In cases involving direct liquid contact with a clothing material, the diffusion step is the rate controlling step in the permeation process and, therefore, is the topic of the remainder of the discussion.

The rate of mass diffusion through a unit surface area of a clothing barrier (or membrane) is proportional to the concentration gradient of the chemical (permeant) across the barrier. This relationship is most often expressed by Fick's Law:

$$J = -D \frac{dc}{dx} \qquad (1)$$

where

J is the mass flux, $\mu g/min/cm^2$;
D is the diffusion coefficient, cm^2/min;
c is the concentration in the membrane, $\mu g/cm^3$; and
x is the distance, in cm, from the contacted membrane surface.

The minus sign in the equation accounts for a decreasing c as x increases.

Integration of equation (1) results in a relationship which is useful for determining the diffusion coefficient from test data. Once D is known for a given chemical/material pair, then the chemical flux can be

estimated over a wide range of thicknesses and challenge concentration conditions. Such a prediction is appropriate since permeation criteria for protective clothing might ultimately be specified as a maximum allowable flux rather than a breakthrough time, as is more commonly the case today.

Where D is not a function of chemical concentration, membrane thickness, or contact time (such as during the steady-state permeation of a non-reactive gas), this integration is straightforward and yields equation (2):

$$J = D \frac{C_1 - C_2}{\ell} \qquad (2)$$

where

C_1 is the permeant concentration in the upstream (higher concentration) surface of the membrane (at $x = 0$);

C_2 is the permeant concentration in the downstream surface of the membrane (at $x = \ell$); and

ℓ is the membrane thickness.

In cases where D is a function of concentration, an integral diffusion coefficient $\overline{D}$ can be defined as:

$$\overline{D} = \frac{1}{C_1 - C_2} \int_{C_2}^{C_1} D\,dc \qquad (3)$$

Examples of $\overline{D}$ as a function of concentration would include:

$$\overline{D} = D_o (1 + f(c))$$
$$\overline{D} = D_o e^{f(c)} \qquad (4)$$

where D_o is the zero-concentration diffusion coefficient. Such a concentration dependence may occur when organics, such as solvent liquids, diffuse through polymeric materials. The result of integrating equation (1) with an integral diffusion coefficient is Equation (5):

$$J = \overline{D} \frac{C_1 - C_2}{\ell} \qquad (5)$$

It should be noted here that many polymers swell--thereby changing their thickness--upon the invasion of a permeating chemical. Crank discusses this on page 28 of The Mathematics of Diffusion.[83] Conventional practice is to disregard this change in the above integration and subsequent calculation of D.

D or $\bar{D}$ can be determined by measuring both C_1 and the permeation flux. C_2 is considered to be 0 when permeation tests are carried out such that downstream membrane surface (at $x = \ell$) is continuously exposed to and flushed by a fluid in which the concentration of the permeant is far below saturation. In the case of the diffusion of a neat chemical, C_1 is the solubility of the compound in the polymer (i.e., $C_1 = C_s$) and can be determined by a separate, long-term immersion experiment.[8] The rate of permeation is typically determined by analytical methods such as GC, IR, UV, or scintillation counting (in the case that the permeant is radiolabeled) of a collecting fluid that contacts the downstream surface of the membrane. ASTM Method F739-85 is an appropriate procedure for such testing. A graphical, idealized representation of chemical permeation through a membrane is presented in Figure 1 in terms of measured concentration versus contact time.

In practice, the determination of the diffusion coefficient is not always straightforward. Consequently, techniques have been developed for estimating this parameter at particular stages of the permeation process. Of particular importance because of the relative ease of their determination and their utility in predictive models are the steady-state diffusion coefficient, D_s, and the lag time diffusion coefficient, D_L. In the following paragraphs, the significance of these diffusion coefficients and methods for their determination are described. Other, more complex, methods for estimating D are presented by Crank[83] and Crank and Park.[84]

1. Steady-State Diffusion Coefficient (D_s)

In ideal diffusion, a constant concentration gradient develops across the membrane and the flux becomes constant (i.e., steady-state permeation) following the transition period after breakthrough. (In many cases involving CPC, non-ideal diffusion occurs and a steady state does not develop.[222]) A steady-state diffusion coefficient, D_s, can be calculated directly from equation (6):

$$D_S = \frac{J\ell}{C_1} \qquad (6)$$

assuming C_2 is small compared to C_1.

The steady-state coefficient may be useful in the selection of clothing materials in cases where some limited exposure to a permeating chemical may be acceptable.

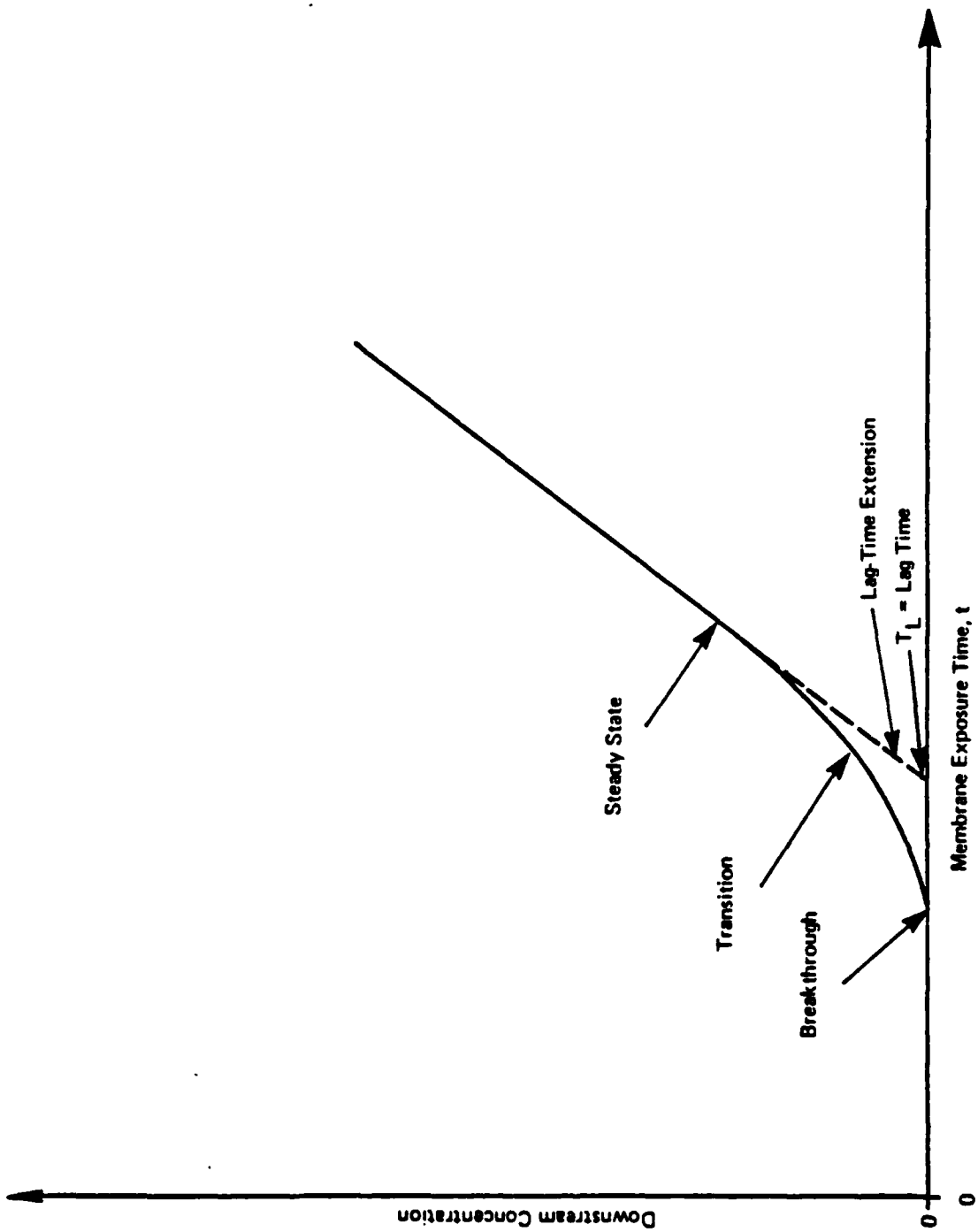

FIGURE 1 IDEAL PERMEATION THROUGH A POLYMERIC MEMBRANE – FIXED COLLECTION VOLUME

2. Lag Time Diffusion Coefficient (D_L)

Another technique for calculating a diffusion coefficient is the lag time method. The lag time coefficient, D_L, is determined by extending the steady-state portion of the permeation curve (see Figure 1) to the time axis. The time, T_L, at the intercept is substituted into equation (7):

$$D_L = \frac{\ell^2}{6T_L} \qquad (7)$$

and D_L calculated. D_L may then be used in equation (2), but this is strictly valid only for those barriers in which the diffusion coefficient is constant. In many cases, D_L is a good approximation for D_S and in some cases a fair approximation to $\bar{D}$ for those barriers in which the diffusion coefficient is variable.

In conclusion, it must be noted that at present there is no overall theory that allows the prediction of the permeability of CPC. Some of the problems faced in developing predictive methods are discussed in the next paragraph.

C. ANOMALOUS PERMEATION

In the previous paragraph ideal permeation was described as a diffusion process in which the breakthrough time is followed by a period of smooth transition to a steady-state situation in which the permeation rate does not change with time. Ideal diffusion is likely to occur with many of the chemical/material pairs experienced on a hazardous waste site. It should be recognized, however, that deviations (i.e., anomalies) from the ideal may occur in a large fraction of the cases. As the name implies, anomalous permeation is not predictable. However, there are several general conditions under which the probability of non-ideal permeation is increased:

- where there may be a reaction of the chemical with the plastic/elastomer of the CPC or some other component of the material. In some cases the reaction will lengthen the breakthrough time and reduce permeation rate by consuming chemical. In other cases the reaction will reduce the barrier effectiveness of the CPC by degrading its properties.

- where the chemical, merely by its being absorbed, changes the properties of the CPC. Many organic liquids are known to craze (produce surface cracks) in the hard, clear plastics used for lenses and face shields.

- where the chemical extracts components from the CPC materials. For example, leaching of plasticizer from PVC clothing will significantly affect its barrier as well as functional properties.

Nelson et al.[222], Weeks et al.[326,327], and Crank and Park[84] present additional discussions of this subject.

D. PERSISTENT PERMEATION

Once a chemical has begun to diffuse into a plastic/elastomer, it will continue to diffuse even after the chemical on the surface is removed. This is due to the concentration gradient that develops within the CPC and the natural tendency for a gradient to equilibrate with its surroundings. This phenomenon has significant implications relative to decontamination and reuse of CPC.

First, in the case of CPC which has not suffered chemical breakthrough but has absorbed some chemical before the chemical is removed from the surface, the chemical may eventually appear on its inside surface. The amount of chemical reaching the inside will be dependent upon the amount of chemical absorbed and its permeation rate. For example, where the absorbed amount is small and the rate slow, it is likely that a large fraction of the absorbed chemical will return to the outside surface where, if it is volatile, it will evaporate to the air, and little or no chemical will reach the inside surface. On the other hand where the permeation rate is fast, there is the potential that a large amount of chemical will appear on the inside surface, perhaps after overnight storage in a locker.[116]

Second, in order to achieve complete decontamination of the CPC, both surface and absorbed chemical must be removed. Since the absorbed chemical will leave the CPC only by a diffusional process, either very long times or conditions which accelerate diffusion are required. These would include high temperatures, vacuum, or perhaps a dry-cleaning process in which a chemical non-degrading to the CPC is used to extract the hazardous chemical. Because of this problem of persistent permeation, extreme caution is advised when using CPC that has been exposed to highly toxic chemicals. In fact, where such chemicals are involved, it may be prudent practice to use disposable clothing.

E. CHEMICAL CLASSIFICATION AND SOLUBILITY PARAMETER

The *Guidelines* provides CPC recommendations for 509 chemicals or aqueous solutions. For those chemical/material pairs for which no recommendations are given, it is suggested that CPC can be selected on the basis of the family to which the chemicals belong. The premise, which is substantiated in permeation literature, is that chemicals of similar composition

or functional groups tend to permeate a given material at relatively similar rates. Extensions and refinements of this premise are that:[262,815]

- higher molecular weight members of a homologous series of chemicals permeate at slower rates than lower molecular weight members.
- pendant groups (which increase the size of a molecule) tend to slow the permeation rate relative to that of the simple molecule.
- permeation rate tends to decrease with increasing boiling point.
- polar chemicals tend to permeate polar materials more rapidly than non-polar chemicals, and the converse is true.

The 509 chemicals or aqueous solutions were categorized into 29 main classes and 67 subclasses according to structure and functional groups.[177] For example, hydrocarbons is a main class which is divided into aliphatic, aromatic, and polynuclear aromatic subclasses. The classes are listed in Table 8.1, Chapter 8 of Volume I. The class into which each chemical was placed can be determined from Appendix B of Volume I.

Upon review of those classes which contain a sufficient number of chemicals on which to base a conclusion, the above generalizations relative to the chemical resistance of materials would appear to apply for most of the chemical/material pairs addressed in this study.

A second means for predicting the chemical resistance of CPC materials is through the use of solubility parameter theory. This theory attempts to quantify the qualitative nature of the above generalizations. According to the theory, the physical and chemical properties of a chemical can be combined mathematically to yield a parameter that is then compared to an empirically determined parameter for the plastic/elastomer. In cases where the parameter of the chemical approximates that of the material, the chemical is predicted to have a high solubility in, or dissolve the material. In other words "likes dissolve likes." Extrapolation of this theory to CPC implies that a material is not likely to be resistant to a chemical having a similar solubility parameter. An especially attractive feature of the theory is that solubility parameters can be calculated for multi-component solutions by weighting the individual parameters according to the relative concentrations of each component in the solution. Consequently, there is the potential for making decisions relative to selecting CPC for the virtually limitless number of solutions that may be encountered.

Typical variations of the theory relate to the factors that are included in the calculation of the solubility parameter and how these parameters are weighted. One of the more widely accepted concepts is the three-component parameter which combines factors for the hydrogen bonding, polarity and dispersion forces of the chemical to yield its overall solubility parameter. Other systems deal with two of these factors. Still other systems favor the single-component solubility parameter and then make adjustments for polarity or hydrogen bonding depending on the application. Similar considerations are also required for the plastic/rubber of CPC.

The results of a limited number of tests of the theory relative to CPC materials show some promise for its application to CPC selection.[287] Henriksen has reviewed the theory in considerable detail, and applied it to the data of Nelson et al. and his own data for epoxy solutions.[147] Christensen[70] has also subjected the data of Nelson et al. to an analysis based on solubility parameter. The data of Nelson are particularly useful in this regard since they result from a large number of experiments with a broad variety of chemicals with well-specified CPC. However, it is important to note that the theory is just that, "a theory," and that there are many variations of the theory, several of which are reviewed by Barton[38] and more recently by L. Snyder.[283,284]

Although solubility parameter theory offers promise for predicting CPC performance, the application of the theory to CPC is in its early stages. Significant problems must be solved before the theory can be applied to the confident selection of CPC. For example, methods must be developed for estimating the two- and/or three-component factors for chemicals other than relatively simple solvents. Similarly, methods are required for estimating the solubility parameters of CPC materials. Perkins et al. have estimated the solubility parameters of selected CPC materials.[285] However, solubility parameters of CPC materials may be strongly influenced by formulation. Finally, it must be remembered that solubility parameter theory is an equilibrium concept. It does not take into account the dynamics of the permeation process. Also needed are approaches to predicting the time-containing element of the permeation equation, i.e., the diffusion coefficient.

CHAPTER 3

TEST METHODS

A. INTRODUCTION

The barrier effectiveness of a particular item of clothing to a particular chemical/mixture is dependent on the specific interactions between the clothing material and the chemical/mixture. This in turn is determined by the formulation of the clothing material, its method of manufacture, and its thickness. Temperature and other conditions of use also influence clothing barrier properties. Finally, the composition of the chemical/mixture is of major importance since relatively small percentages of a second, third, etc., component can drastically alter the way in which a chemical interacts with a material.

With the above in mind it is highly desirable that protective clothing selection decisions be based on the results of testing of the chemical/clothing material pair of interest. The objective of such testing is to quantify the key parameters discussed in Chapter 2. Of particular concern are:

- The solubility of the chemical/mixture in the clothing material.
- The breakthrough time of the chemical for the material.
- The permeation rate of the chemical through the material.

B. SOLUBILITY

Solubility is the weight of chemical absorbed by a known weight of material. In general, chemicals having solubilities > 10% rapidly permeate the rubber or plastic. ASTM Method D471-79 and ISO Method 2025 (International Standards Organization) describe methods for determining solubility. The procedure simply involves immersing the material in the chemical. In case of multi-layered clothing materials, only the normally outside surface should be exposed to chemical. If the solubility values are to be later used in calculating permeation rates, then each material of the multi-layer system should be tested separately. Periodically the material is removed, patted dry and weighed until a constant weight is obtained. In addition to noting weight changes, the chemical and the material should be inspected for discoloration, indicative of decomposition of the clothing material. Also the clothing material should be examined for physical degradation using a knife, spatula, or other probe.

Solubility testing is simple and can readily be performed wherever at least a two decimal place balance is available. Multiple tests can be

performed simultaneously using as little as 0.5 g and as much as 100 g of clothing material per test, depending on the sensitivity of the balance.

Solubility testing represents the minimum level of evaluation that can be performed for any unknown or multi-component hazardous waste.

C. DEGRADATION

The physical and/or aesthetic qualities of CPC can be significantly and and undesirably changed due to exposure to chemicals. Chemical degradation testing simply involves measuring the properties or qualities of interest before and after exposure to the chemical. The results are compared and the change, if there is any, judged as to its acceptability for the intended application of the item of clothing. ASTM Method D543 describes one such method for plastic materials. ASTM Committee F-23 is presently developing a method specifically focussed on clothing materials.

Similar to solubility testing, degradation can be performed in the field and can be used as a means for screening candidate clothing materials prior to more involved and expensive testing such as the permeation test described below.

D. PERMEATION

Breakthrough time and permeation rate are determined by means of a permeation test. ASTM Method F739-85 was specifically developed for the evaluation of protective clothing materials.[149] (A printed copy of this method is available from ASTM, 1916 Race Street, Philadelphia, PA 19103.) The method uses a test cell which is divided into two chambers at the midline by the clothing material to be tested. (See Figure 2.) The potentially hazardous chemical is placed in one chamber and the other chamber (i.e., the collection chamber) is monitored for the chemical of interest. As shown, the cell is assembled for a liquid challenge chemical. Gaseous chemicals can also be tested by forming the cell from two collection chambers. The test gas is then flowed continuously through the challenge chamber. Of interest are the time the chemical is first detected (i.e., breakthrough time) and the subsequent rate of permeation. Of critical importance in conducting the test is that the collecting medium not interact with the clothing material; air, nitrogen, helium, or water are preferred collection media.

The detection of breakthrough is dependent on the sensitivity of the analytical method used for measuring the chemical in the collection medium. Typical preferred analytical methods include gas, liquid and ion chromatography, analysis for total combustible organics, ultraviolet and infrared spectrophotometry, and radioanalysis. The properties of the chemical, the sensitivity requirements for the test, and cost are the

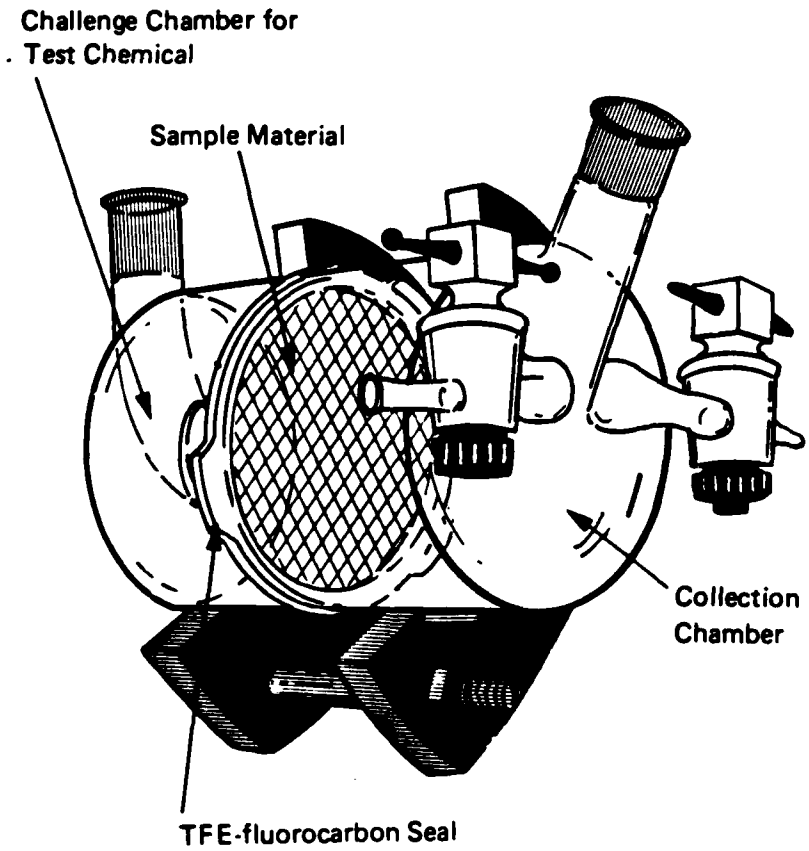

FIGURE 2. SKETCH OF ASTM F739-85 PERMEATION TEST CHAMBER

principal factors considered in selecting an analytical method. For relatively volatile chemicals, gas chromatography and infrared spectrophotometry are the preferred methods. Liquid chromatography is used for relatively nonvolatile organic compounds. Ion chromatography is particularly useful for inorganic acids and salts. Finally, radiolabelled compounds may be preferred where high sensitivity and specificity is required; furthermore, if the compound of interest is readily available in radiolabelled form, radiochemical methods may be significantly less costly than the development and use of the other techniques.

Permeation testing of protective clothing materials has increased significantly during the past five years. The *Journal of the American Industrial Hygiene Association* has become the principal vehicle for dissemination of test findings. (See Bibliography.) Also of note is Standard Technical Publication 900 of the ASTM which contains several pertinent articles.[32] In addition permeation data are available from several clothing and clothing material vendors.[45,80,107,213,227,286]

The International Standards Organization (ISO) has promulgated two other methods for evaluating chemical protective clothing:

- Method 6529 - Protective Clothing Resistant to Penetration by Dangerous Liquid Chemicals.
- Method 6530 - Clothing for *Limited* (ed.) Protection Against Dangerous Liquid Chemicals.

Neither method is recommended since the results are difficult to interpret relative to the selection of CPC. Presently ISO is in the final stages of developing a standard permeation test. This standard is analogous to ASTM Method F739.

A notable difference between the ASTM and ISO standards is the inclusion of clothing labelling (marking) instructions in the ISO method. The label must indicate the performance of the clothing material as a barrier to the test chemicals. Such labeling is an aid to those considering the use of the clothing much the same as fire extinguisher labels are.

With the significant increase in permeation data in recent years, the need and opportunity for data interpretation and comparison have also increased. Permeation test results are highly dependent on the experimental procedure, generic material, cell configuration, and analytical sensitivity. ASTM Committee F-23 is presently developing a specification for data reporting that will facilitate interpretation and comparison of test results. This same committee has promulgated a list of fifteen chemicals (ASTM F1001-86) that can serve as a standard battery for ranking clothing barrier properties. The fifteen chemicals represent a wide range of chemical families and are: acetone, acetonitrile, carbon disulphide, dichloromethane, diethylamine, dimethylformamide, ethyl

acetate, n-hexane, methanol, nitrobenzene, 50% sodium hydroxide, sulfuric acid, tetrachloroethylene, tetrahydrofuran, and toluene.

E. VISIBILITY

Face shields and lenses, in addition to being chemical barriers, must provide clear, undistorted vision to the wearer. Hard, inflexible face shields and lenses may be subject to crazing (i.e., surface cracking) upon contact with certain chemicals. Crazing renders the surface foggy and can drastically reduce vision. Since chemical contact with the face shield or lens is more likely to occur in uncontrolled or emergency situations when reduced vision would be an additional severe hazard, shields and lens materials should be tested for resistance to chemical attack. Crazing can also reduce the impact strength of the material.

ANSI/ASTM Method F484-77 describes a procedure for measuring stress crazing by chemicals. A method for assessing the effect of chemicals on clear plastics is by measuring the transparency of the plastic before and after exposure to the chemical; ASTM D1746 describes one such method. While both these methods will adequately show up potential incompatibilities, they require equipment that is not likely to be available in field or chemistry laboratories. A simpler test, which could be performed on site, requires only a placard on which are printed letters ranging from large to small in size. Analogous to a common vision test, the placard is read through an unexposed face shield or lens material, with a distance of 10 to 15 feet between the plastic and the placard. Note is made of the ease with which the letters can be read and the minimum size letter which can be read. The face shield or lens material is then swabbed or immersed in the chemical of interest for at least one hour. (Note, if the face shield or lens has different coatings or plastic layers on the inside and outside surfaces, only the outside surface should be exposed to the chemical.) Remove the material from the chemical and allow to air dry. Inspect the material and repeat the placard reading test.

F. PENETRATION

In addition to permeation, which occurs by molecular diffusion, liquid chemicals can cross a CPC barrier by penetration. Penetration is the movement of chemical through holes such as at seams, zippers, and other closures as well as through flaws in the CPC. Penetration can also occur through porous woven and non-woven fabrics and through fabrics based on microporous films. Gore-Tex™ is one brand of such microporous film-based fabric.

ASTM Committee F-23 has promulgated method F903-84 for the evaluation of the penetration resistance of CPC and its materials of construction. Briefly, a swatch of material or seam or closure is clamped in a two-

chambered cell. The chemical of concern is charged to one chamber and pressure applied. The unexposed surface in the second chamber is observed for appearance of the chemical.

G. OTHER FACTORS

The focus of the *Guidelines* and the above discussion is chemical resistance of clothing materials. It is important to consider, however, that in the selection and use of protective clothing other factors may be of equal or greater importance. For example, gloves must provide the wearer some minimum level of dexterity, and the fabrics must have some level of tear resistance. The relative importance of the performance factors is largely dependent on the work tasks to be carried out.

At present there is no standard, overall protocol for evaluating protective clothing or clothing materials for all the performance parameters of importance to workers on hazardous waste sites. Instead, individual tests appropriate for the evaluation of specific parameters must be selected from the volumes of procedures promulgated by federal, military, and standards organizations. A 1978 NIOSH study addressed this problem and resulted in a listing of test methods especially pertinent to protective clothing.[78] That compilation has been expanded where appropriate and is presented herein as Table 3.1. For completeness, the chemical resistance methods mentioned above are included in the Table. In addition to this listing, several tests specific to full-body protective clothing are discussed in Chapter 5 of Volume I.

TABLE 3.1

TEST METHODS FOR CHEMICAL PROTECTIVE CLOTHING*

Characteristics	Test
A. Chemical Resistance	
1. Permeation Resistance	ASTM F739-81: Resistance of Protective Clothing Materials to Permeation by Hazardous Liquid Chemicals
2. Swelling and Solubility	ASTM D471-79: Rubber Property--Effects of Liquids
3. Strength Degradation	ASTM D543: Resistance of Plastics to Chemical Reagents
4. Crazing	ASTM F484-77: Stress Crazing of Acrylic Plastics in Contact With Liquid or Semi-Liquid Compounds
5. Transparency	ASTM 1746-70: Transparency of Plastic Sheeting
6. Penetration Resistance	ASTM F903-84: Resistance of Protective Clothing Materials to Penetration by Liquids
B. Strength	
1. Tear Resistance and Strength	ASTM D751-73: Testing of Coated Fabrics ASTM D412-75: Rubber Properties in Tension Fed. 191A-5102 (ASTM D1682): Strength and Elongation, Breaking of Woven Cloth: Cut Strip Method Fed. 191A-5134 (ASTM D2261): Tearing Strength of Woven Fabrics by the Tongue Method
2. Puncture Resistance	See Reference 78
3. Abrasion Resistance	ASTM D1175: Abrasion Resistance of Textile Fabrics

TABLE 3.1 (Continued)

TEST METHODS FOR CHEMICAL PROTECTIVE CLOTHING*

Characteristics	Test
C. Dexterity/Flexibility	
1. Dexterity (gloves only)	See References 78, 122, 289
2. Flexibility	ASTM D1388: Stiffness of Fabrics, Cantilever Test Method
D. Aging Resistance	
1. Ozone Resistance	ASTM D3041-72: Coated Fabrics--Ozone Cracking in a Chamber ASTM D1149-64: Rubber Deterioration--Dynamic Ozone Cracking in a Chamber
2. UV Resistance	ASTM G27: Operating Xenon-Arc Type Apparatus for Light Exposure of Non-Metallic Materials--Method A--Continuous Exposure to Light

*Physical property tests are listed in Tables 5.2 and 5.3 of Volume I.

CHAPTER 4

ANALYSIS OF THE VENDORS' LITERATURE

A. INTRODUCTION

Chapter 7 of Volume I contains an overview of the major strengths and weaknesses of the literature supplied by CPC vendors. The purpose and strength of this literature is to describe the composition, styles, and sizes of protective clothing. In recent years the literature of several clothing manufacturers has also become an important source of chemical resistance information, particularly permeation data. However, much of the literature remains weak in its level of documentation as to the basis for the qualitative chemical resistance tables. As noted in Volume I, ratings tables are intended for and should be used only for guidance in the selection of CPC. This chapter extends the depth of the Volume I discussion of the present vendors' chemical resistance tables and discusses their future.

B. REVIEW OF VENDORS' LITERATURE

The catalogues of 150 CPC vendors and materials suppliers were reviewed during the preparation of the *Guidelines*. Twenty-six of these documents included chemical resistance ratings charts for some or all of the products listed. These tables encompassed both qualitative and quantitative ratings. In only a few cases was the rationale for the qualitative ratings described in the catalogues. The rationale is necessary for any attempt to form conclusions regarding the expected performance of CPC and to compare products. Consequently, telephone interviews were conducted with the CPC vendors who provided qualitative ratings. The telephone interviews yielded little information that would further aid the utilization of the qualitative ratings. The overall impression was that most vendors are either not testing clothing or are not willing to share their results.

The situation is much different for the chemical resistance tables that are based on permeation test results. Virtually all vendors who provide such data followed ASTM Method F739, or a similar procedure.

1. Permeation Testing

Permeation data are supplied or available on request from at least ten CPC vendors or materials suppliers. This number is up from six in 1985. Furthermore, the number of chemicals and range of products have increased significantly, and this increase can be expected to continue. CPC users have become more demanding of the vendors and the vendors have found that test data are useful as points of product differentiation.

However, the increased availability of test results carries with it the problems associated with comparing and interpreting data. The vendors do not use a standard format for presenting the data and, as discussed earlier, the test results can be highly dependent on the testing procedure. In order to compare breakthrough times, it is necessary to know the sensitivity of the detector, the surface area of the clothing material, and the collection medium volume if the test is performed in a closed-loop mode or the collection medium flowrate if the test is performed in an open-loop mode. The following discussion provides some insights into reviewing and utilizing published breakthrough time and permeation rate data.

Test results are available from the following vendors: Ansell, Best, ChemFab, Comasec, DuPont, Edmont, MSA, North, Pioneer, and Playtex. (see the Appendix D of Volume I for the complete corporate name and address.) All except Best provide breakthrough time data; Best ranks by breakthrough time the materials tested. All except MSA report permeation rate data. The units used by all except Edmont for permeation rate are $mg/m^2/s$; Edmont reports values $\mu g/cm^2/min$, consistent with ASTM F739. Multiply the Edmont values by 0.167 to convert them to $mg/m^2/s$. Only Best and ChemFab report the sensitivity of the instrument used to detect breakthrough. Only MSA provides information on the mode of testing (open-loop) and the collection medium flowrate. Some of the others provide information on the mode of testing but not the collection medium volume or flowrate. Consequently, it is not possible to rigorously compare breakthrough time data from vendor to vendor. As suggested above and by the vendors themselves the data should be used for guidance only and imply no guarantee of protection.

2. Immersion Testing

Most qualitative recommendations tables appear to be based on simple immersion tests in which the material was merely observed after some time period. There is no standard time for immersion and, of course, the rating associated with any given test is likely to vary from observer to observer. Furthermore, in some cases materials that were swelled by chemicals may have been given an acceptable recommendation if upon drying they returned to their original size and appearance. Obviously a material which is visibly swelled by a chemical will not be a barrier to that chemical and should be given a "not recommended" rating.

At present there is no standard immersion test for CPC. ASTM Committee F-23 is considering several, but final acceptance is not expected before 1988. It is likely that the procedure will specify the immersion time and two or three properties to be measured before and after immersion. Initially a standard immersion test will be useful for identifying chemical/material pairs that are grossly incompatible. In time, once larger amounts of data become available from standard immersion and permeation tests, correlations may be developed that will allow more sensitive prediction of CPC performance from immersion test data alone.

3. Applicability of Ratings Tables

The degree of applicability of some of the ratings tables to presently available CPC is somewhat limited by two factors: age and materials composition. Many of the tables are more than ten years old. Between the time that the tables were generated and now, it is probable that the actual elastomer/plastic formulation used in the CPC has been changed. This may have resulted from a CPC manufacturer switching raw materials suppliers or modifying the formulation to meet changed processing, use or cost requirements. Changes to, for example, the plasticizer, lubricant, filler, and so forth, level in a elastomer/plastic formulation can in some cases significantly influence the chemical resistance of the final product.

Significant differences exist between various vendors' ratings for nominally the same CPC chemical/material pair. While this may be due to the subjectivity of the test methods, there also may be real differences between products. The difference may in part be due to the fact that the different formulations of the same base elastomer/plastic material may perform differently, and in part due to the manufacturing methods. In other words, it is possible for one supplier to have a more chemically resistant material (e.g., PVC or butyl rubber, etc.) than another supplier. This point has been documented in the literature.[268]

Similarly, most of the ratings charts appear to have been developed for a general class of material (for example, natural rubber or PVC) and not the specific formulations used for protective clothing. Thus, the ratings may or may not be directly applicable to CPC.

The form of the elastomer/plastic can also influence the results on which recommendations may be based. For example, a molded neoprene rubber can have significantly different properties from those of a neoprene prepared from a latex. Within the realm of CPC, it has recently been suggested that gloves prepared by a latex process may perform differently from gloves prepared by a solvent-dip process, but that additional evaluation was required before definite conclusions could be reached.[326] It is not clear whether the recommendations of manufacturers which have switched from solvent to latex processing during the past 10 to 15 years have been modified to reflect any performance differences that may have resulted.

The temperature range over which the ratings apply is not generally stated. CPC users should note that there can be significant temperature effects on permeation over the temperature range likely to be encountered in the field. For example, the breakthrough times for benzene through a 0.08 cm neoprene were found to be 40 min at 7°C, 24 min at 22°C, and 16 min at 37°C.[78]

Finally, the sensitivity, if any, of the ratings to lot-to-lot variations in the products are not provided. Also some manufacturers rate several grades or thicknesses of a given CPC material as if they all performed

similarly. In these cases, the CPC user must carefully scrutinize the catalogues in order to differentiate among the products and make the best selection for the application at hand.

4. Multi-component Solutions

Multi-componet solutions represent a potentially large and difficult area for CPC selection and use. In general most vendors address only aqueous solutions in their ratings tables. Several vendors are careful to designate a concentration range for each recommendation; many do not. Small fractions of particularly permeable chemicals in a solution can severely degrade clothing materials or can provide pathways for the movement of other components of the solutions. Furthermore, there is an unlimited number of solution compositions possible. Generally, the vendors recommend that the CPC buyer conduct his own tests with the specific solutions of concern. Multi-component solutions are of growing interest to the research community and others.[104,124,278,302]

5. Experience

Several manufacturers reported that some of the recommendations appearing in their tables were based on experience rather than testing. This may or may not be appropriate depending on how the experience was judged. For example, in many cases an item of CPC may be considered good for a particular application because it does not fall apart or because it returns to its original shape/size upon evaporation of absorbed chemical. Obviously such criteria are not appropriate if skin contact with the chemical is a primary concern.

On the other hand, experience can be a suitable basis for a recommendation when it originates from careful observation of worker well-being. For example, a particular type of glove may prevent contact dermatitis where all other gloves fail.

C. PERSPECTIVES ON VENDORS' LITERATURE

Although the above findings and comments can be rather perplexing, for those responsible for selecting CPC, the situation is changing rapidly for the better:

- There is a growing general understanding among CPC buyers that chemicals can permeate CPC without there being any outward sign of degradation or swelling of the material.

- There is growing technical/scientific interest in CPC performance. Many of the larger chemical companies, several independent testing laboratories, and some universities now have groups evaluating CPC materials. Furthermore, the federal government has become keenly aware of the need for rigorous

analysis of CPC performance, as evidenced by this publication and an increase in government sponsored research and development.

- The general acceptance of a standard permeation test method.

- Vendors are becoming more comfortable with the liability aspects of publishing test data. In fact publishing data obtained under well-specified conditions may be less risky than the promulgation of qualitative recommendations tables. Vendors routinely print disclaimers along with their test data which caution that they may not apply to the particular condition to which the buyer intends to subject CPC. The buyer is also advised to perform his own testing with the actual chemical/chemical mixtures at the use temperatures.

D. CONCLUSION

The primary sources of information pertinent to the chemical resistance of CPC are the CPC vendors and manufacturers. This is not likely to change in the near future. Users of the vendors' recommendations and data tables must always bear in mind the limitations of the charts, as described above. The tables are for guidance only. That is the charts are a good place to start the CPC selection process, but they are not guarantees of safety. Whenever possible, the potential CPC user should evaluate candidate products against the particular chemicals and solutions of concern. Final selection must take into account the CPC application.

During the next several years, other sources for CPC recommendations can be expected to increase. Such sources, of which this publication is an example, will be based on the compilation of both manufacturers' recommendations and the scientific literature. It is reasonable to predict and it is hoped that the existence of one or more key secondary sources will stimulate more testing and quantitative reporting of CPC performance by both the vendors and the technical community at large. The result will be more firmly based CPC selection decisions.

CHAPTER 5

SOURCES FOR CHEMICAL PROTECTIVE CLOTHING INFORMATION

A. INDUSTRY

By far the best source for information on CPC is the CPC vendors. The large, full-line vendors and the specialty products manufacturers generally have tested their products against a wide range of chemicals. Furthermore, they have years of experience with their products, and typically have a very good understanding of the products' capabilities and limitations. A listing of vendors is given in Volume I, Appendix D.

A second source of information is the chemical manufacturers. These organizations provide clothing for their workers and often conduct their own analysis of protective clothing performance for their chemical products.

B. GOVERNMENT

Principal sources of CPC information within federal government agencies are:

EPA - Office of Occupational Health and Safety, Room 3503, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. Telephone 202-382-3647 (David Weitzman).

Federal Emergency Management Agency (FEMA) - United States Fire Administration, Office of Firefighter Health and Safety, 16825 South Seton Avenue, Emmitsburg, MD 21727. Telephone 301-447-1182 (Robert McCarthy).

OHSA - Technical Assistance, Room N3657, 200 Constitution Avenue, NW Washington, D.C. 20210. Telephone 202-523-7505 (Ching Bien).

NIOSH - Division of Safety Research, Testing and Criteria Branch, ASI Section, 944 Chestnut Ridge Road, Morgantown, WV 26505. Telephone 304-291-4339 (Stephen Berardinelli).

U.S. Coast Guard - Headquarters, Office of Research and Development, Commandant, G-DMT-3, 2100 Second Street, S.W., Washington, D.C. 20593. Telephone 202-267-0853 (Lt. Jeffrey Stull).

These agencies are involved in the study, development, and utilization of protective clothing.

C. PROFESSIONAL ORGANIZATIONS

In the United States, three professional organizations have committees directly focused on protective clothing. ASTM formed Committee F-23 in 1977 for the purpose of developing standard test methods for protective clothing. Subcommittees of F-23 are addressing the chemical resistance of clothing, the physical properties of clothing, clothing classification methods, and the performance of full-body protective ensembles. The committee is composed of industry, government, and general interest members. It meets twice a year and is a forum for discussing protective clothing test methods. In addition in 1984 and in 1987 Committee F-23 sponsored international symposia on all aspects of protective clothing. Proceedings of the symposia are published by ASTM as Standard Technical Publications. For further information, telephone ASTM headquarters (215-299-5579).

The American Industrial Hygiene Association addresses CPC through its technical committee Personal Protective Devices (other than respirators). The committee meets once a year in coincidence with the American Industrial Hygiene Conference. This week-long conference typically includes one or two sessions devoted to protective clothing. At these sessions, technical papers are presented describing research, evaluation or use of protective clothing. Information on this and other AIHA activities may be obtained from AIHA headquarters (216-762-7924).

The National Fire Protection Association (NFPA) formed a subcommittee on Hazardous Chemical Protective Clothing in 1986. This subcommittee was established under the NFPA Technical Committee on Protective Equipment for Firefighters. The subcommittee is engaged in writing performance oriented (manufacturing) standards on chemical protective suits for emergency response personnel. Its membership is composed of representatives from users, manufacturers, testing laboratories, and government. It meets three times a year and plans to complete proposed standards for chemical protective suits by December 1987. For further information, contact Bruce Teele of the NFPA (617-770-3000).

D. TECHNICAL LITERATURE

In recent years, the principal sources of published technical papers and reports on personal protective clothing have been the:

- American Industrial Hygiene Association Journal, a monthly publication. AIHA, 475 Wolf Ledges Park, Akron, OH 44311-1087. Telephone 216-762-7924.

- National Technical Information Service (NTIS). Essentially all federal government sponsored studies may be obtained through NTIS. NTIS, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. Telephone 703-487-4650.

A new journal, Applied Industrial Hygiene, has been started by the American Conference of Governmental Industrial Hygienist (ACGIH), 6500 Glenway Avenue, Bldg. D-7, Cincinnati, OH 45211. Telephone 513-661-7881. Also articles on protective clothing are usually included in the proceedings of Hazardous Materials Management Conference (Tower Conference Management Company, Wheaton, IL 60187) and the Hazardous Material Spills Conference (Government Industries, Inc., Rockville, MD 20850).

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APPENDICES

DESCRIPTION OF COLUMN HEADINGS FOR APPENDICES A THROUGH E

Chemical Name:	Alphabetical listing of chemicals as shown in Appendix B of Volume I. Synonym, if given, in parentheses.
CAS No:	Chemical Abstract Service (CAS) Registry Number.
Resistant Material:	The normally outside material of the CPC (i.e., the chemical contact surface). See Appendix E of Volume I.
Product Description:	See column 1 of Appendix E in Volume I.
Vendor:	See Appendix E of Volume II. UNK = Unknown.
Breakthrough Time:	See Appendix A of Volume I.
Permeation Rate:	See Appendix A of Volume I.
Percent Weight Change/ Immersion Time:	Change in weight of CPC specimen due to immersion in chemical for time indicated.
Percent Swell/ Immersion Time:	Volume change due to immersion in chemical for time indicated.
Diffusion Coefficient:	$a \times 10^{b}$ cm^2/sec.
Temperature:	Test temperature, if reported; otherwise assumed to be 25°C.
Thickness:	Initial thickness of test specimen, if reported; otherwise no value is given.
Ref Number:	Source of data. See Bibliography.

APPENDIX A

PERMEATION DATA

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Acetaldehyde								
000750700	BUTYL	014	118	9.58	.40	23.	.04	323
				9.60	.40	23.		227
	CPE	060	113	.17 - .50		25.	.07	302
			UNK	.66		23.		142
				.28		23.		142
	NATURAL RUBBER	001	103		48.10	23.		045
		017	100	.12	90.18 - 901.80	23.	.05	107
	NEOPRENE	002	100	.28	901.80 - 9,018.00	23.		107
		018	100	.20	199.00	23.	.05	323
				.17	901.80 - 9,018.00	23.	.04	107
		125	103		72.14	23.		045
	NITRILE	019	103		529.06	23.		045
			118	< .01	967.93	23.	.03	323
				.07	967.93	23.	.04	227
	NITRILE+PVC	058	100	.05	901.80 - 9,018.00	23.		107
	PE	076	100	.05	901.80 - 9,018.00	23.		107
	PV ALCOHOL	102	100	.27	282.56	23.	.03	323
	PVC	007	103		264.53	23.		045
		077	100	.05	9.02 - 90.18	23.		107
				.08	901.80 - 9,018.00	23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	< .01	1,694.78	23.	.03	323
	VITON/CHLOROBUTYL	112	113	.50 - .66		25.	.04	302
			UNK	> 3.00		23.		142
Acetic Acid								
000641970	CPE	060	113	> 3.00		25.	.07	302
				3.95		23.	.05	204
				2.40	42.08	23.	.05	204
	NATURAL RUBBER	001	UNK	.68		23.		052
		015	UNK	.85		23.	.04	052
		017	100	2.25		23.	.05	107
			102	4.50		23.	.05	026
				2.50		23.	.05	026
				1.50		23.	.05	026
				2.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	1.50		23.	.06	026
				1.50		23.	.04	026
				3.50		23.	.05	026
			121	1.27	96.19	23.	.05	237
	NEOP/NAT RUBBER	008	102	3.50		23.		026
			UNK	> 1.00		23.		052
	NEOPRENE	002	100	> 6.00		23.		107
			210	6.00		23.		080
		018	100	7.00		23.	.04	107
			UNK	> 1.00		23.	.06	052
				> 1.00		23.	.09	052
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	4.50		23.	.06	107
			UNK	> 1.00		23.	.05	052

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000641970	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.27		23.		107
	PE	076	100	.25		23.		107
			127	5.00		23.		104
	PVC	003	UNK	.08		23.	.02	052
		007	100	3.00		23.		107
			210	4.00	12.02	23.		080
			UNK	> 1.00		23.		052
		077	100	.75		23.		107
				.10		23.		107
	SARANEX	061	127	> 66.67		23.		104
	TEFLON	069	510	> 4.00	< .02	25.	.05	303
	VITON	009	UNK	> 1.00		23.	.03	052
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
Acetic Acid, >70%								
000641973	NATURAL RUBBER	001	120	.35	18.04	23.	.05	236
	NITRILE	005	120	1.97	1,328.65	23.	.06	236
	PVC	003	120	1.42	1.80	23.	.08	236
Acetic Anhydride								
001082470	BUTYL	014	118	> 8.00	< .02	23.	.09	323
	CPE	060	113	1.25		23.	.05	204
				1.20	54.11	23.	.05	204
	NATURAL RUBBER	001	250	.05	10.02	20.	.02	323
	NEOPRENE	018	100	3.50	6.01	20.	.05	323
	PVC	007	100	.07	120.24	20.	.02	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Acetone								
000676410	BUTYL	014	118	> 20.33		23.	.08	323
				> 17.00		23.	.04	227
			216	> 4.00		21.	.07	124
	CPE	060	113	.33 - .42		25.	.07	302
				.53 - .58		22.	.07	302
				.45 - .52		25.	.07	302
				.28		23.	.05	204
				.25	1,022.04	23.	.05	204
	NATURAL RUBBER	001	103		288.58	23.		045
			210	.10	60.12	23.		080
			UNK	.23	35.07	23.	.12	274
		017	100	.09	110.22	25.	.03	222
				.17	90.18 - 901.80	23.	.05	107
			102	.13	4.81	23.	.05	026
				.17	9.02	23.	.05	026
				.13	5.41	23.	.05	026
				.15	7.21	23.	.05	026
			120	.04	210.42	25.	.02	222
			502	.10	82.16	25.	.05	222
			504	.25	66.13	25.	.05	222
				.45	45.09	25.	.06	222
			UNK	.10	> 140.28	23.	.04	274
	NEOP+NAT RUBBER	026	102	.08	100.20	25.	.05	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000676410	NEOP+NAT RUBBER	026	102	.12	8.42	23.	.06	026
				.08	12.63	23.	.04	026
				.13	4.81	23.	.05	026
			121	.05	126.25	23.	.05	237
	NEOP/NAT RUBBER	008	102	.13	4.81	23.		026
			114	.13	46.09	25.	.05	222
			UNK	.13	> 150.30	23.	.05	274
	NEOPRENE	002	100	.17	90.18 - 901.80	23.		107
				.04	180.36	25.	.08	222
			120	.04	310.62	25.	.07	222
			210	.10	72.14	23.		080
		018	100	.23	334.27	23.	.05	323
				.08	90.18 - 901.80	23.	.04	107
			118	.95	86.17	25.	.08	222
			120	.32	140.28	25.	.05	222
				.53	170.34	25.	.07	222
				.55	90.18	25.	.05	222
				.27	140.28	25.	.03	222
			UNK	> 1.00		23.	.09	274
				.43	120.24	23.	.06	274
		125	103		1,557.11	23.		045
	NITRILE	005	210	.33	480.96	23.		080
		019	100	.09	2,004.00	25.	.04	222
				.22	< 801.60	25.	.06	222
				.08	< 801.60	25.	.04	222
			181	.07	801.60	25.	.03	222
			503	.05	1,503.00	25.	.03	222
			UNK	.08	> 150.30	23.	.05	274
				.10	> 110.22	23.	.05	274
	NITRILE+PVC	057	210	.25	312.62	23.		080
	PE	006	100	> 1.00	< 30.06	25.	.01	222
			505	.07	2.00	25.	.01	222
		076	100	.05	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 4.00		21.		124
			UNK	.50	> 60.12	23.	.12	274
		102	100	.07	13.83	23.	.04	323
	PVC	007	210	.30	541.08	23.		080
			UNK	.15	> 140.28	23.	.16	274
	SARANEX	061	127	.55	19.84	23.		104
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
				> 3.50	< .02	25.	.05	303
	VITON	009	118	< .01	4,843.87	23.	.02	323
			UNK	.03	> 150.30	23.	.03	274
	VITON/CHLOROBUTYL	112	113	.87 - 1.28		25.	.04	302
				1.58 - 1.63		20.	.04	302
				.72 - .88		27.	.04	302
				.88 - 1.02		25.	.04	302
Acetonitrile								
000750580	BUTYL	014	118	> 8.00		23.	.07	323
				> 8.00		23.	.04	227
		064	117	> 8.00		23.	.02	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000750580	BUTYL	064	117	> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	060	113	1.33 - 1.42		25.	.07	302
	NATURAL RUBBER	001	103		150.30	23.		045
			506	< .01	117.23	23.	.01	323
	NEOPRENE	018	100	1.27	10.82	23.	.06	323
		093	117	< .18		23.	.02	213
		125	103		72.14	23.		045
		138	117	.58		23.	.03	213
		139	117	.83		23.	.01	213
	NITRILE	019	103		66.13	23.		045
	PE	076	117	< .01		23.	.02	213
	PV ALCOHOL	102	100	> 8.00		23.	.04	323
	PVC	007	103		66.13	23.		045
		049	117	.05		23.	.01	213
	SARANEX	061	117	> 8.00		23.	.01	213
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 4.50	< .02	25.	.05	303
	VITON	145	117	> 8.00		23.	.01	213
	VITON/CHLOROBUTYL	112	113	1.50 - 1.75		25.	.04	302
	VITON/NEOPRENE	111	117	.75		23.	.02	213
Acetophenone								
000988620	TEFLON	069	510	> 92.00	< .02	25.	.05	303
Acetyl Chloride								
000753650	SARANEX	061	127	.62	1.10	23.		104
	TEFLON	069	510	> 3.10	< .02	23.	.05	303
Acrolein								
001070280	BUTYL	014	118	> 15.00		23.	.06	323
	CPE	060	UNK	.13		23.		142
				.92		23.		142
	NITRILE	019	100	.07	966.13	23.	.04	323
	PV ALCOHOL	102	100	.25	3.01	23.	.03	323
	VITON	009	118	< .01	432.86	23.	.02	323
	VITON/CHLOROBUTYL	112	UNK	> 3.00		23.		142
Acrylic Acid								
000791070	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Acrylonitrile								
001071310	CPE	070	UNK	.28		23.	.05	004
	PE	076	127	.08	< .02	23.		104
	SARANEX	061	127	.38	< .02	23.		104
	TEFLON	069	510	.90	.08	23.		303
Allyl Alcohol								
001071860	BUTYL	014	UNK	> 8.17		25.		287
		064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
001071860	BUTYL/NEOPRENE	110	117	>	8.00			23.	.02	213
	CPE	070	UNK		2.00			23.	.05	004
	NEOPRENE	002	UNK		2.35		1.44	25.		287
		093	117		1.58			23.	.02	213
		138	117		6.08			23.	.03	213
		139	117		3.42			23.	.02	213
	PE	076	117		1.67			23.	.01	213
	PV ALCOHOL	004	UNK		.24		33.07	25.		287
	PVC	049	117		1.75			23.	.01	213
		077	117	<	.08			23.	.01	213
	SARANEX	061	117	>	8.00			23.	.01	213
	TEFLON	069	510	>	3.10	<	.02	23.	.05	303
	VITON	145	117	>	8.00			23.	.01	213
	VITON/NEOPRENE	111	117	>	8.00			23.	.02	213
Allylamine										
001071190	BUTYL	014	118		3.92		70.14	20.	.06	323
	NATURAL RUBBER	001	250	<	.02		6,633.24	20.	.01	323
	PV ALCOHOL	102	100		.20		12,114.18	23.	.07	323
	PVC	007	100	<	.02		9,829.62	20.	.02	323
Allyl Chloride										
001070510	CPE	070	UNK		1.25			23.	.05	004
	TEFLON	069	510		1.70	<	.02	23.	.05	303
					2.76	<	.02	23.	.05	303
Ammonium Fluoride, 30-70%										
121250182	NATURAL RUBBER	017	100	>	6.00			23.	.05	107
	NEOPRENE	002	100	>	6.00			23.		107
		018	100	>	6.00			23.	.04	107
	NITRILE	019	100	>	6.00			23.	.06	107
	PVC	007	100	>	6.00			23.		107
Ammonium Hydroxide										
013362160	NATURAL RUBBER	001	210		2.00			23.		080
	NEOP+NAT RUBBER	026	121		.45		18.04	23.	.05	237
	NEOPRENE	002	210		6.00	<	.02	23.		080
	NITRILE	005	210		6.00	<	.02	23.		080
	NITRILE+PVC	057	210		3.00			23.		080
		058	100		.18			23.		107
	PE	076	100		.07			23.		107
	PVC	007	210		.75			23.		080
		077	100	>	6.00			23.		107
					.30			23.		107
Ammonium Hydroxide, <30%										
013362161	NATURAL RUBBER	001	UNK	>	1.00			23.		052
		017	100		1.75			23.	.05	107
	NEOPRENE	002	100	>	6.00			23.		107
		018	100	>	6.00			23.	.04	107
			UNK	>	1.00			23.	.06	052
				>	1.00			23.	.09	052
	NITRILE	019	100	>	6.00			23.	.06	107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
013362161	NITRILE	019	UNK	> 1.00		23.	.05	052
	PVC	003	UNK	.02		23.	.02	052
		007	100	4.00		23.		107
	VITON	009	UNK	> 1.00		23.	.03	052
Ammonium Hydroxide, 30-70%								
013362162	PE	076	127	< .02	10.32	23.		104
Amyl Acetate (Pentyl Acetate)								
006286370	NATURAL RUBBER	001	210	.20	60.12	23.		080
	NEOPRENE	002	210	.25	66.13	23.		080
	NITRILE	005	210	.67	30.06	23.		080
		019	100	1.00	9.02 - 90.18	23.	.06	107
	NITRILE+PVC	057	210	.83	42.08	23.		080
	PE	076	100	< .05	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	210	.50	48.10	23.		080
Amyl Alcohol (Pentanol)								
000714100	BUTYL	014	118	> 8.00	< .02	23.	.07	323
	NATURAL RUBBER	017	100	.12	.90 - 9.02	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
				5.35	.20	23.	.05	323
	NITRILE	019	100	.50	< .90	23.	.06	107
				> 8.00	< .02	23.	.04	323
	NITRILE+PVC	058	100	.08	.90 - 9.02	23.		107
	PE	076	100	.20	< .90	23.		107
	PV ALCOHOL	004	100	3.50	< .90	23.		107
	PVC	007	100	.20	< .90	23.		107
		077	100	.17 - .54	9.02	23.		107
				.17	< .90	23.		107
	VITON	009	118	> 8.00	< .02	23.	.05	323
Aniline (Benzamine)								
000625330	BUTYL	012	UNK	> 6.50	1.99	25.	.04	273
				> 6.50	1.99	25.	.04	273
				> 22.00	< .02	25.	.06	273
				> 22.00	< .02	25.	.06	273
				7.00	< .02	25.	.04	273
				7.00	< .02	25.	.04	273
				> 23.00	< .02	25.	.06	273
				> 23.00	< .02	25.	.06	273
				7.00	1.20	25.	.04	273
				7.00	< .02	25.	.04	273
				> 8.00	< .02	25.	.06	273
				> 8.00	< .02	25.	.06	273
		014	118	> 8.00		23.	.03	323
				> 8.00		23.	.04	227
		064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000625330	NATURAL RUBBER	001	210	1.00	6.01	23.		080
			UNK	.53		23.	.12	274
		017	100	> 1.00	< 40.08	25.	.03	222
				.50	.90 - 9.02	23.	.05	107
			120	> 1.00	< 40.08	25.	.02	222
			504	> 1.00	< 40.08	25.	.05	222
				> 1.00	< 40.08	25.	.06	222
			UNK	.50	> 10.02	23.	.04	274
	NEOP+NAT RUBBER	026	121	1.00	252.50	23.	.05	237
	NEOP/NAT RUBBER	008	114	.09	15.03	25.	.05	222
			UNK	> 1.00		23.	.05	274
	NEOPRENE	002	100	3.00	.90 - 9.02	23.		107
			120	> 1.00	< 40.08	25.	.07	222
			210	.50	12.02	23.		080
		018	100	.58	.90 - 9.02	23.	.04	107
			120	> 1.00	< 40.08	25.	.05	222
				> 1.00	< 40.08	25.	.05	222
				> 1.00	< 40.08	25.	.03	222
			UNK	> 1.00		23.	.06	274
				> 1.00		23.	.09	274
				.50	6.01	25.	.04	273
				1.00	6.01	25.	.04	273
				2.00	3.01	25.	.06	273
				2.50	9.02	25.	.06	273
		093	117	1.73		23.	.02	213
		138	117	4.33		23.	.03	213
		139	117	2.75		23.	.02	213
	NITRILE	005	210	2.50	30.06	23.		080
		019	100	1.60	120.24	25.	.04	222
			118	1.05	270.54	23.	.04	323
				1.10	270.54	23.	.04	227
			503	.30	180.36	25.	.03	222
			UNK	> 1.00		23.	.05	274
				> 1.00		23.	.05	274
				1.50	3.01	25.	.04	273
				1.50	3.01	25.	.04	273
				2.50	3.01	25.	.06	273
				5.42	3.01	25.	.06	273
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.17	.90 - 9.02	23.		107
	PE	006	100	> 1.00	< 40.08	25.	.01	222
			505	.05		25.	.01	222
		076	100	.07	.90 - 9.02	23.		107
			117	6.58		23.	.01	213
	PV ALCOHOL	004	100	1.50	.90 - 9.02	23.		107
			UNK	> 1.00		23.	.12	274
		102	100	> 16.00		23.	.03	323
	PVC	003	120	.05	180.36	25.	.01	222
				.30	160.32	25.	.03	222
				.15	160.32	25.	.02	222
		007	100	3.00	.90 - 9.02	23.		107
			210	4.00	8.42	23.		080
			UNK	> 1.00		23.	.16	274

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000625330	PVC	049	117	1.25		23.	.01	213
		077	100	.33	.90 - 9.02	23.		107
				.50	.90 - 9.02	23.		107
	SARANEX	061	117	> 8.00		23.	.01	213
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 3.30	< .02	23.	.05	303
	VITON	009	118	.10	112.42	23.	.03	323
				.17	112.42	23.	.02	227
			UNK	> 1.00		23.	.03	274
		145	117	.83		23.	.01	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Benzaldehyde								
001005270	BUTYL	014	118	> 9.00		23.	.07	323
	NATURAL RUBBER	017	100	.23	9.02 - 90.18	23.	.05	107
	NEOPRENE	018	100	.65	24.05	23.	.05	323
	NITRILE	019	100	.40	25.85	23.	.03	323
	PE	076	100	.17	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	VITON	009	118	9.93	24.05	23.	.03	323
Benzene								
000714320	BUTYL	014	118	.52	194.19	23.	.04	323
				.52	194.19	23.	.04	227
			UNK	.33		23.	.02	327
		034	UNK	1.47	130.26	22.	.08	078
		064	117	.08		23.	.02	213
				> .08		23.	.01	213
				.67		23.	.02	213
			507	1.00	90.18	22.	.06	078
			UNK	.13		23.	.04	327
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	070	UNK	.43		23.	.05	004
	EVA	074	UNK	.01		23.	.02	327
	NATURAL RUBBER	001	210	.18	396.79	23.		080
		017	100	.04	3,206.40	25.	.03	222
			120	.03	5,611.20	25.	.02	222
			502	.05	2,605.20	25.	.05	222
			504	.06	2,204.40	25.	.05	222
				.12	1,603.20	25.	.06	222
			508	.03	501.00	22.	.03	078
			UNK	.01		23.	.05	327
				.02		23.	.02	327
	NEOP+NAT RUBBER	026	102	.05	2,805.60	25.	.04	222
			121	.05	2,254.50	23.	.05	237
	NEOP/NAT RUBBER	008	114	.09	2,004.00	25.	.05	222
				.05	400.80	22.	.05	078
	NEOPRENE	002	100	.25	80.16	22.	.07	078
				.02	951.90	25.	.08	222
			120	.40	300.60	25.	.07	222
			210	.25	559.12	23.		080
			UNK	.29	517.03	22.	.11	333

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000714320	NEOPRENE	002	UNK	.14	1,167.33	22.	.08	333
		010	120	.11	521.04	22.	.04	078
		018	100	.28	165.93	23.	.05	323
				.10	300.60	22.	.04	078
			120	.19	1,002.00	25.	.05	222
				.27	1,102.20	25.	.07	222
				.27	801.60	25.	.05	222
				.08	1,803.60	25.	.03	222
			UNK	.12		22.	.04	333
				.10		22.	.05	333
				.19	1,893.78	22.	.05	333
				.33		23.	.06	327
		031	UNK	3.10	50.10	22.	.24	078
				1.00	80.16	22.	.16	078
				.41	230.46	22.	.08	078
				.27	330.66	37.	.08	078
				.67	190.38	7.	.08	078
				.40	230.46	22.	.08	078
				.11	501.00	22.	.04	078
		093	117	< .08		23.	.02	213
		138	117	< .08		23.	.03	213
		139	117	> 8.00		23.	.02	213
	NITRILE	005	210	.33	901.80	23.		080
			503	.10	501.00	22.	.02	078
		019	100	.32	.03	23.	.04	323
				1.05	400.80	25.	.04	222
				.77	511.02	25.	.06	222
				.32	851.70	25.	.05	222
			181	.15	1,102.20	25.	.03	222
			503	.07	1,302.60	25.	.03	222
			UNK	.17		23.	.04	327
				.23	870.74	22.	.04	333
				.32	939.88	22.	.04	333
		033	UNK	.08	501.00	22.	.04	078
	NITRILE+PVC	057	210	.75	180.36	23.		080
		058	100	.03	901.80 - 9,018.00	23.		107
	NONWOVEN PE	071	UNK	.01		23.	.01	327
	PE	006	100	< .01	250.50	25.	.01	222
			209	< .02	350.70	22.	.01	078
			505	.07	50.10	25.	.01	222
		042	UNK	< .03		23.	.01	327
		076	100	.03	90.18 - 901.80	23.		107
			117	.08		23.	.01	213
			UNK	.01		23.	.01	327
				.02	220.44	22.	.01	078
	POLYURETHANE	050	178	.03	110.22	22.	.02	078
	PV ALCOHOL	004	100	.12	< .90	23.		107
				.17	8.02	22.	.02	078
			UNK	> 33.33		22.	.09	333
				.33		23.	.02	327
		035	UNK	.05	39.08	22.	.01	078
		102	100	.82	< .02	23.	.03	323
	PVC	003	100	< .01	1,182.56	23.	.02	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000714320	PVC	003	120	.01	3,507.00	25.	.01	222
				.01	4,108.20	25.	.01	222
				.04	1,503.00	25.	.03	222
				.04	1,603.20	25.	.02	222
			500	< .01	4,709.40	25.	.01	222
			501	.01	3,607.20	25.	.01	222
				< .01	4,909.80	25.	.02	222
			UNK	.02		23.	.01	327
		007	210	.50	240.48	23.		080
			UNK	.30	481.96	22.	.10	333
				.17	599.20	22.	.11	333
				.31	421.84	22.	.11	333
		049	117	.10		23.	.01	213
		077	117	< .16		23.	.01	213
			168	.10	150.30	22.	.04	078
	SARANEX	061	117	.25		23.	.01	213
			UNK	.17		23.	.01	327
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	036	UNK	.17		23.	.01	327
		069	510	> 3.20	< .02	23.	.05	303
				> 3.00	< .02	25.	.05	303
	VITON	009	118	5.93	.07	23.	.02	323
				6.00	.07	23.	.02	227
			UNK	.50		23.	.02	327
		032	UNK	15.00	.50	22.	.16	078
		145	117	> 8.00		23.	.01	213
	VITON/NEOPRENE	111	117	3.50		23.	.02	213
Benzenesulfonic Acid								
000986790	NEOPRENE	018	100	> 20.00		23.	.05	123
	NITRILE	020	216	> 4.00		23.	.04	123
Benzethonium Chloride								
001215400	BUTYL	014	118	> 8.00	< .02	22.	.06	323
	NATURAL RUBBER	001	250	> 8.00	< .02	21.	.02	323
	NEOPRENE	018	100	> 8.00	< .02	19.	.05	323
	PVC	007	100	> 8.00	< .02	19.	.02	323
Benzonitrile								
001004700	BUTYL	014	118	> 8.00		23.	.06	323
	NATURAL RUBBER	001	506	< .01	24.05	23.	.01	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	.93	24.05	23.	.03	323
Benzoyl Chloride								
000988840	BUTYL	014	118	6.28	99.80	23.	.06	323
	HYPALON	108	210	.33		23.	.06	123
	NEOPRENE	018	100	.25		23.	.05	123
	PV ALCOHOL	102	100	> 8.00		23.	.05	323
	PVC	003	100	< .01	596.39	23.	.02	323
	VITON	009	118	> 8.00		23.	.02	323
				.75		23.	.03	123

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Benzyl Alcohol								
001005160	BUTYL	014	216	> 4.00		23.	.07	123
	VITON	009	118	> 20.00		23.	.03	123
Benzyl Chloride (Chloromethyl Benzene)								
001004470	CPE	070	UNK	.78		23.	.05	004
	TEFLON	069	510	> 3.20	< .02	23.	.05	303
Bis(2-Ethylhexyl) Phthalate								
001178170	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	017	100	> 6.00	< .90	23.	.05	107
	NEOPRENE	002	100	2.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
				4.33	12.02	23.	.05	323
	PV ALCOHOL	004	100	.50	90.18 - 901.80	23.		107
	PVC	003	100	.03	12.02	23.	.02	323
	VITON	009	118	> 8.00		23.	.05	323
Boric Acid								
100433530	BUTYL	014	118	> 8.00	< .02	20.	.07	323
	NEOPRENE	018	100	> 8.00	< .02	19.	.05	323
	NITRILE	019	100	> 8.00	< .02	21.	.04	323
	VITON	009	118	> 8.00	< .02	20.	.03	323
Bromine								
077269560	PE	076	127	< .02		23.		104
Bromoacetonitrile								
005901700	BUTYL	014	118	> 8.00		23.	.06	323
	NATURAL RUBBER	001	506	< .01	57.11	23.	.01	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	> 8.00		23.	.02	323
Bromobenzene								
001088610	BUTYL	014	118	.53	239.28	23.	.06	323
	NITRILE	019	118	.22	54.71	23.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.02	323
	VITON	009	118	> 8.00		23.	.03	323
2-Bromoethanol								
005405120	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	.02	66.13	23.	.02	323
	PVC	003	100	.03	456.91	23.	.02	323
	VITON	009	118	> 8.00		23.	.05	323
1-Bromo-2-propanol								
196867380	BUTYL	014	118	> 8.00		23.	.06	323
	NATURAL RUBBER	001	506	.02	45.69	23.	.01	323
	PV ALCOHOL	102	100	> 8.00		23.	.02	323
	VITON	009	118	> 8.00		23.	.02	323

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PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
3-Bromo-1-propanol								
006271890	BUTYL	014	118	> 8.00		23.	.06	323
	NEOPRENE	018	100	> 8.00		23.	.05	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	> 8.00		23.	.02	323
Butadiene								
001069900	BUTYL	014	118	> 8.00		23.	.07	323
	NATURAL RUBBER	001	250	< .02	637.27	23.	.02	323
	NEOPRENE	018	100	.78	1.80	23.	.05	323
	PVC	003	100	< .02	126.25	23.	.02	323
	VITON	009	118	> 8.00		23.	.05	323
tert-Butanol (Methylpropanol, 2-,2-)								
000756500	BUTYL	014	118	> 8.00		23.	.07	323
	NATURAL RUBBER	001	250	.02	18.04	23.	.02	323
	NEOPRENE	018	100	2.75	.05	23.	.05	323
	PVC	007	100	.08	18.04	23.	.02	323
Butyl Acetate								
001238640	BUTYL	014	118	1.90	45.76	23.	.04	227
				1.53	36.07	23.	.05	086
	NATURAL RUBBER	001	210	.13	216.43	23.		080
		017	100	.07	1,402.80	25.	.03	222
			102	.07	72.14	23.	.05	026
				.07	72.14	23.	.05	026
				.07	72.14	23.	.05	026
				.07	72.14	23.	.05	026
			120	.03	2,905.80	25.	.02	222
			502	.11	941.88	25.	.05	222
			504	.13	881.76	25.	.05	222
				.23	511.02	25.	.06	222
	NEOP+NAT RUBBER	026	102	.11	641.28	25.	.05	222
				.07	72.14	23.	.06	026
				.07	72.14	23.	.04	026
				.07	72.14	23.	.05	026
	NEOP/NAT RUBBER	008	102	.07	72.14	23.		026
			114	.15	641.28	25.	.05	222
	NEOPRENE	002	100	.09	220.44	25.	.08	222
			120	.06	320.64	25.	.07	222
			210	.25	72.14	23.		080
		018	100	.32	210.42	23.	.06	086
			118	> 1.00	< 21.04	25.	.08	222
			120	.48	320.64	25.	.05	222
				.87	320.64	25.	.07	222
				> 1.00	< 21.04	25.	.05	222
				.18	831.66	25.	.03	222
	NITRILE	005	210	1.33	90.18	23.		080
		019	100	.55	480.96	25.	.04	222
				1.25	90.18 - 901.80	23.	.06	107
				.97	250.50	25.	.06	222
				.67	450.90	25.	.04	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001238640	NITRILE	019	100	1.08	102.20	23.	.06	086
			118	.48	327.05	23.	.04	227
				.25	300.60	23.	.04	086
			120	.53	217.10	23.	.05	086
			503	.33	350.70	25.	.03	222
		020	503	.32	150.30	23.	.04	086
	NITRILE+PVC	057	210	.67	60.12	23.		080
	PE	006	100	.03	20.04	25.	.01	222
			505	.20	6.01	25.	.01	222
			512	.03	66.13	23.	.01	086
		076	100	.17	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	003	120	.02	6,012.00	25.	.01	222
				.02	6,913.80	25.	.01	222
				.04	3,306.60	25.	.03	222
				.03	4,308.60	25.	.02	222
			500	.01		25.	.01	222
			501	.03	6,412.80	25.	.01	222
				.03	4,108.20	25.	.02	222
		007	210	.33	72.14	23.		080
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	.23	318.97	23.	.04	086
Butyl Acrylate								
001413220	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Butyl Alcohol (Butanol, 1)								
000713630	NATURAL RUBBER	001	210	2.00	12.02	23.		080
		017	100	.25	9.02 - 90.18	23.	.05	107
	NEOP+NAT RUBBER	026	121	.58	> 6.01	23.	.05	237
	NEOPRENE	002	100	> 8.00	< .90	23.		107
			210	6.00	< .02	23.		080
		018	100	4.00	.90 - 9.02	23.	.04	107
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.58	.90 - 9.02	23.		107
	PE	076	100	> 6.00	< .90	23.		107
			127	> 8.00	< 30.06	23.		104
	PV ALCOHOL	004	100	.50	9.02 - 90.18	23.		107
				> 8.00		23.		123
				> 4.00		21.		124
	PVC	007	100	3.00	.90 - 9.02	23.		107
			210	2.00	15.03	23.		080
		077	100	.42	< .90	23.		107
				.67	9.02 - 90.18	23.		107
	TEFLON	069	510	> 15.60	< .02	23.	.05	303
Butylamine								
001097390	BUTYL	014	118	1.73	501.00	15.	.10	323
	CPE	060	UNK	.50		23.		142
				1.00		23.		142

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001097390	CPE	070	UNK	.33		23.	.05	004
	NATURAL RUBBER	001	250	.02	7,745.46	20.	.02	323
	NEOPRENE	018	100	.20	2,474.94	18.	.05	323
	PVC	007	100	.02	5,531.04	18.	.02	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON/CHLOROBUTYL	112	UNK	.50		23.		142
iso-Butylamine (Methylpropylamine, 2-)								
000788190	BUTYL	014	118	3.70	60.12	28.	.09	323
	CPE	060	UNK	2.28		23.		142
				2.42		23.		142
	NEOPRENE	018	100	.32	889.78	26.	.05	323
		138	117	< .08		23.	.03	213
	PV ALCOHOL	102	100	.32	835.67	23.	.07	323
	PVC	007	100	.02	3,432.85	28.	.02	323
	VITON/CHLOROBUTYL	112	UNK	1.25		23.		142
sec-Butylamine								
139528460	BUTYL	014	118	2.68	180.36	21.	.09	323
	NEOPRENE	018	100	.27	1,402.80	25.	.05	323
	NITRILE	019	100	.33	1,482.96	14.	.04	323
	PVC	007	100	.01	4,529.04	24.	.02	323
tert-Butylamine								
000756490	BUTYL	014	118	> 8.00	< .02	15.	.09	323
	NEOPRENE	018	100	1.17	360.72	23.	.05	323
	NITRILE	019	100	1.40	240.48	21.	.04	323
	PVC	007	100	.03	3,036.06	20.	.02	323
Butyl Cellosolve (Butoxyethanol, 2)								
001117620	NITRILE	019	100	.45		37.	.06	107
				.35		37.	.06	107
			118	> 4.00		22.	.03	122
				.15	200.40	34.	.04	122
	PV ALCOHOL	004	100	> 18.00		22.	.04	122
n-Butyl Chloride (Chlorobutane,1-)								
001096930	NITRILE	019	100	.20	661.32	23.	.05	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.08	323
	PVC	003	100	.20	2,278.55	23.	.02	323
	VITON	009	118	7.42	3.01	23.	.05	323
n-Butyl Phthalate								
000847420	BUTYL	014	118	> 16.00		23.	.04	323
				> 16.00		23.	.04	227
	NATURAL RUBBER	017	100	.28		23.	.05	107
	NEOPRENE	002	100	5.00	.90 - 9.02	23.		107
		018	100	2.00	< .90	23.	.04	107
		125	103		< .02	23.		045
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
			103		< .02	23.		045
			118	> 16.00		23.	.03	323
				> 16.00		23.	.04	227

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000847420	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	PVC	077	100	> 6.00		23.		107
				> 6.00		23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	118	> 8.00		23.	.03	323
				> 8.00		23.	.02	227
p-tert-Butyl Toluene								
271302120	BUTYL	014	118	1.78	48.10	23.	.06	323
				1.70	48.10	23.	.04	227
	NEOPRENE	018	100	1.22	421.44	23.	.05	323
	NITRILE	019	100	> 6.00		23.	.04	323
	PV ALCOHOL	102	100	> 7.00		23.	.03	323
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	> 8.00		23.	.02	323
				> 8.00		23.	.02	227
Butyraldehyde								
001237280	BUTYL	014	118	> 15.00		23.	.07	323
	NEOPRENE	018	100	.73	75.75	23.	.05	323
	PV ALCOHOL	102	100	.27	.78	23.	.03	323
	TEFLON	069	510	> 7.50	< .02	23.	.05	303
	VITON	009	118	.90	54.11	23.	.03	323
Carbon Disulfide (Carbon Bisulfide)								
000751500	BUTYL	014	118	.05	591.58	23.	.06	323
				.12	588.24	23.	.04	227
	CPE	060	113	.13 - .17		25.	.07	302
		070	UNK	.13		23.	.05	004
	NEOP+NAT RUBBER	026	121	.02	889.78	23.	.05	237
	NITRILE	019	100	.50	90.18 - 901.80	23.	.06	107
			118	.15	306.61	23.	.04	323
				.22	306.61	23.	.04	227
	PE	076	100	.12	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	TEFLON	069	510	.36	.05	23.	.05	303
				.34	.07	23.	.05	303
				.30	.05	23.	.05	303
				.22		24.	.05	303
				.22		24.	.05	303
				.60		24.	.05	303
				.60		24.	.05	303
	VITON	009	118	> 16.00		23.	.03	323
				> 16.00		23.	.02	227
	VITON/CHLOROBUTYL	112	113	.18 - .25		25.	.04	302
Carbon Tetrachloride (Tetrachloromethane)								
000562350	CPE	060	113	3.48		23.	.05	204
				3.45	78.16	23.	.05	204

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000562350	NATURAL RUBBER	017	100	.06	1,603.20	25.	.03	222
			120	.03	6,012.00	25.	.02	222
			502	.08	5,110.20	25.	.05	222
			504	.50	801.60	25.	.05	222
				.18	1,603.20	25.	.06	222
	NEOP+NAT RUBBER	026	102	.07	4,609.20	25.	.05	222
	NEOP/NAT RUBBER	008	114	.17	3,106.20	25.	.05	222
	NEOPRENE	002	100	.50	100.20	25.	.08	222
			120	.08	501.00	25.	.07	222
			UNK	.24	300.60	22.	.11	333
				.17	619.24	22.	.08	333
		018	118	> 1.00	< 6.01	25.	.08	222
			120	.57	801.60	25.	.05	222
				.68	901.80	25.	.07	222
				.38	901.80	25.	.05	222
				.22	801.60	25.	.03	222
			UNK	.14	2,244.48	22.	.05	333
				.32	1,756.51	22.	.05	333
				.24	1,997.99	22.	.04	333
	NITRILE	019	100	> 1.00	< 6.01	25.	.04	222
				2.50	9.02 - 90.18	23.	.06	107
				> 1.00	< -1,669.98	25.	.06	222
				> 1.00	< 6.01	25.	.04	222
			118	3.40	30.06	23.	.04	227
			181	> 1.00	< 6.01	25.	.03	222
			503	> 1.00	< 6.01	25.	.03	222
			UNK	> 3.33		22.	.04	333
				> 3.33		22.	.04	333
	NITRILE+PVC	058	100	.05	9.02 - 90.18	23.		107
	PE	006	100	.03	501.00	25.	.01	222
			505	.13	80.16	25.	.01	222
		076	100	.08	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
			UNK	> 3.33	3.01	22.	.09	333
		102	100	> 8.00		23.	.04	323
	PVC	003	120	.01	1,002.00	25.	.01	222
				.03	2,004.00	25.	.01	222
				.14	601.20	25.	.03	222
				.04	801.60	25.	.02	222
			500	.02	2,104.20	25.	.01	222
			501	.02	2,505.00	25.	.01	222
				.02	2,004.00	25.	.02	222
		007	100	.42	90.18 - 901.80	23.		107
			UNK	.22	496.99	22.	.11	333
				.66	203.41	22.	.11	333
				.51	250.50	22.	.10	333
		077	100	.12	9.02 - 90.18	23.		107
				.25	9.02 - 90.18	23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 13.00		23.	.02	227

Chlorine

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
077825050	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	NEOPRENE	093	117	> 8.00		23.	.02	213
		138	117	> 8.00		23.	.03	213
		139	117	> 8.00		23.	.02	213
	PE	076	117	.08		23.	.01	213
	PVC	049	117	.92		23.	.01	213
				.08		23.	.01	213
		053	117	< .08		23.	.02	213
	SARANEX	061	117	> 8.00		23.	.01	213
	VITON	145	117	> 8.00		23.	.01	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Chloroacetic Acid								
000791180	PE	076	127	> 8.00		23.		104
				.08		65.		104
	SARANEX	061	127	1.00		65.		104
Chloroacetonitrile								
001071420	BUTYL	014	118	> 8.00		23.	.06	323
	NATURAL RUBBER	001	506	< .01	75.75	23.	.01	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	> 8.00		23.	.03	323
Chlorobenzene								
001089070	BUTYL	014	118	.58	3,086.16	23.	.07	323
	NEOPRENE	002	UNK	.18		23.	.05	186
	NITRILE	005	229	.21	940.21	23.	.11	210
		019	120	.25	960.25	23.	.04	210
	PE	076	100	.07	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	.25	9.02 - 90.18	23.		107
		102	100	> 8.00	< .02	23.	.08	323
	PVC	007	100	.03	3,757.50	23.	.02	323
			UNK	.15		23.	.05	186
				.31		23.	.07	186
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 4.00		23.	.03	210
				> 8.00	< .02	23.	.03	323
2-Chloro-1,3-butadiene (Chloroprene)								
001269980	NEOPRENE	002	UNK	.05	1,764.52	22.	.08	333
				.05	783.56	22.	.11	333
		018	UNK	.07		22.	.04	333
				.11		22.	.05	333
				.10	3,164.32	22.	.05	333
	NITRILE	019	UNK	.06	2,329.65	22.	.04	333
				.12	2,077.15	22.	.04	333
	PV ALCOHOL	004	UNK	> 16.67		22.	.09	333
	PVC	007	UNK	.08	669.34	22.	.11	333
				.09	851.70	22.	.10	333
				.07	954.91	22.	.11	333

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Chlorodibromomethane								
001244810	BUTYL	012	118	3.27	149.75	23.	.10	323
	PV ALCOHOL	004	100	.60	.02	23.	.07	323
	PVC	003	100	.03	1,106.21	23.	.02	323
	VITON	009	118	> 8.00		23.	.04	323
Chloroform (Trichloromethane)								
000676630	CPE	060	113	.50 - .58		25.	.07	302
		070	UNK	.20		23.	.05	004
	NATURAL RUBBER	017	100	.03	4,008.00	25.	.03	222
			120	.01	15,030.00	25.	.02	222
			502	.04	7,615.20	25.	.05	222
			504	.05	5,611.20	25.	.05	222
				.05	7,014.00	25.	.06	222
	NEOP+NAT RUBBER	026	102	.05	7,014.00	25.	.05	222
	NEOP/NAT RUBBER	008	114	.11	4,408.80	25.	.05	222
	NEOPRENE	002	100	.02	2,705.40	25.	.08	222
			120	.01	6,813.60	25.	.07	222
		018	118	.36	2,004.00	25.	.08	222
			120	.16	3,206.40	25.	.05	222
				.23	2,805.60	25.	.07	222
				.17	2,505.00	25.	.05	222
				.06	4,408.80	25.	.03	222
		031	UNK	.20		23.	.04	187
	NITRILE	019	100	.08	9,418.80	25.	.04	222
				.21	5,611.20	25.	.06	222
				.04	9,919.80	25.	.04	222
			118	.07	2,116.22	23.	.04	227
			503	.07	7,014.00	25.	.03	222
		033	UNK	.16		23.	.05	187
	PE	006	100	.01	1,603.20	25.	.01	222
			505	.05		25.	.01	222
		056	UNK	.07		23.	.01	187
		076	100	.10	9.02 - 90.18	23.		107
			127	< .02	348.70	23.		104
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 8.00		23.	.03	323
	PVC	003	120	.01	15,030.00	25.	.01	222
				.01	> 16,699.98	25.	.01	222
				.01	5,410.80	25.	.03	222
				.01	11,022.00	25.	.02	222
			500	.01	15,030.00	25.	.01	222
			501	.01	12,024.00	25.	.01	222
				.01	13,026.00	25.	.02	222
		049	UNK	.14		23.	.03	187
	SARANEX	061	127	< .02	201.40	23.		104
	SILVER SHIELD	122	118	.17	.05	23.	.01	227
	TEFLON	069	510	> 3.60	< .02	23.	.05	303
	VITON	009	118	9.50	2.77	23.	.02	227
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
3-Chloro-2-methylpropene								

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
005634730	BUTYL	014	118	.50	120.24	23.	.06	323
	PV ALCOHOL	004	100	.03	80.16	23.	.04	323
	PVC	007	100	.01	120.24	23.	.02	323
	VITON	009	118	3.83	30.06	23.	.03	323
Chloronaphthalenes (all isomers)								
255864300	NITRILE	019	118	2.90	> 7.93	23.	.04	227
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	> 16.00	< -1,669.98	23.	.02	227
2-Chloro-2-nitropropane								
005947180	BUTYL	012	118	> 8.00	< .02	23.	.09	323
	NATURAL RUBBER	017	506	.02	270.54	23.	.02	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.07	323
	VITON	009	118	2.05	120.24	23.	.04	323
1-Chloro-2-propanol								
001270040	BUTYL	014	118	> 8.00		23.	.06	323
	NATURAL RUBBER	001	506	< .01		23.	.01	323
	PVC	003	100	.02	230.86	23.	.02	323
	VITON	009	118	> 8.00		23.	.03	323
3-Chloro-1-propanol								
006273050	BUTYL	014	118	> 8.00		23.	.06	323
	PV ALCOHOL	102	100	.80	92.58	23.	.04	323
	PVC	003	100	.18	409.42	23.	.02	323
	VITON	009	118	> 8.00		23.	.03	323
Chlorosulfonic Acid								
077909450	PE	076	127	1.05		23.		104
	SARANEX	061	127	5.83		23.		104
o-Chlorotoluene								
000954980	NITRILE	005	229	.29	1,163.99	23.	.11	210
		019	120	.88	988.64	23.	.04	210
	VITON	009	118	> 4.00		23.	.03	210
p-Chlorotoluene								
001064340	NITRILE	005	229	.25	1,224.11	23.	.11	210
		019	120	.42	890.11	23.	.04	210
	VITON	009	118	> 4.00		23.	.03	210
Chromic Acid								
111157450	NATURAL RUBBER	001	210	1.17		23.		080
	NEOPRENE	002	210	1.25		23.		080
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	210	6.00	< .02	23.		080
		077	100	> 6.00		23.		107
				> 6.00		23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Chromic Acid, <30%								
111157451	NEOP+NAT RUBBER	026	121	> 8.00	< .02	23.	.05	237
Chromic Acid, 30-70%								
111157452	NITRILE	019	100	4.00		23.	.06	107
	PVC	007	100	> 6.00		23.		107
Citric Acid, <30%								
000779291	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PV ALCOHOL	004	100	.83		23.		107
	PVC	007	100	> 6.00		23.		107
		077	100	> 6.00		23.		107
				> 6.00		23.		107
Creosote								
080015890	BUTYL	034	UNK	> 90.00		22.	.08	078
	NEOPRENE	031	UNK	4.50		22.	.08	078
	VITON	032	UNK	> 96.00		22.	.04	078
Creosote, Wood								
080213940	NEOPRENE	018	100	> 4.00		23.	.05	123
	VITON	009	118	> 19.00		23.	.03	123
m-Cresol								
001083940	NATURAL RUBBER	017	100	.60		25.	.03	222
			120	.23	15.03	25.	.02	222
			502	.50	2.00	25.	.05	222
			504	> 1.00	1.00	25.	.05	222
				> 1.00	1.00	25.	.06	222
	NEOP+NAT RUBBER	026	102	.50	2.00	25.	.05	222
	NEOP/NAT RUBBER	008	114	> 1.00	1.00	25.	.05	222
	NEOPRENE	002	100	> 1.00	1.00	25.	.08	222
		018	118	> 1.00	1.00	25.	.08	222
			120	> 1.00	1.00	25.	.05	222
				> 1.00	1.00	25.	.07	222
				> 1.00	1.00	25.	.05	222
				> 1.00	1.00	25.	.03	222
	NITRILE	019	100	> 1.00	1.00	25.	.04	222
				> 1.00	1.00	25.	.06	222
				> 1.00	1.00	25.	.04	222
			503	> 1.00	1.00	25.	.03	222
	PE	006	100	> 1.00	1.00	25.	.01	222
			505	> 1.00	< .10	25.	.01	222
	PVC	003	120	.20	67.13	25.	.01	222
				.23	59.12	25.	.01	222
				> 1.00	1.00	25.	.03	222
				.23	63.13	25.	.02	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

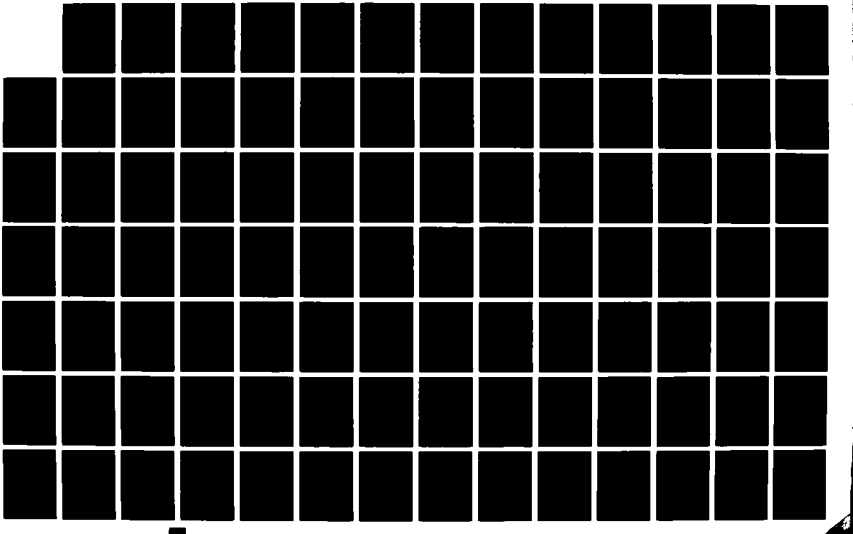
CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001083940	PVC	003	500	.13	44.09	25.	.01	222
			501	.13	55.11	25.	.01	222
				.12	56.11	25.	.02	222
	TEFLON	069	510	> 4.00	< .02	23.	.05	303
Cresols								
013197730	PE	076	127	.67 - 1.00	.40	23.		104
	SARANEX	061	127	> 2.00	< .13	23.		104
Crotonaldehyde (Butenal,trans-2)								
041703030	BUTYL	014	118	> 8.00		23.	.07	323
	CPE	070	UNK	.63		23.	.05	004
	NEOPRENE	018	100	.35	209.22	23.	.05	323
	PV ALCOHOL	102	100	< .01	57.72	23.	.03	323
	TEFLON	069	510	> 3.10	< .02	23.	.05	303
	VITON	009	118	.12	313.83	23.	.03	323
Cumene (Methylethyl Benzene)								
000988280	CPE	070	UNK	1.30		23.	.05	004
Cyclohexane								
001108270	BUTYL	014	118	1.15	122.04	23.	.07	323
				1.10	122.04	23.	.04	227
	NATURAL RUBBER	001	210	.10	2,044.08	23.		080
		017	100		10.02	25.	.03	222
			120	.03	1,503.00	25.	.02	222
			502	.13	1,302.60	25.	.05	222
			504	.16	1,102.20	25.	.05	222
				.30	801.60	25.	.06	222
	NEOP+NAT RUBBER	026	102	.08	1,402.80	25.	.05	222
	NEOPRENE	002	120	.16	70.14	25.	.07	222
			210	.10	1,082.16	23.		080
		018	100	.95	.18	23.	.04	323
			120	> 1.00	< 10.02	25.	.05	222
				.48	100.20	25.	.05	222
				1.20	100.20	25.	.03	222
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00		23.	.04	323
				> 1.00	< 10.02	25.	.04	222
				> 1.00	< 1.00	25.	.06	222
				> 1.00	< 1.00	25.	.04	222
			181	> 1.00	< 1.00	25.	.03	222
			503	> 1.00	< 10.02	25.	.03	222
	NITRILE+PVC	057	210	3.00	12.02	23.		080
	PE	006	100	.03	100.20	25.	.01	222
			505	.17	28.06	25.	.01	222
	PV ALCOHOL	102	100	.78	< .02	23.	.03	323
	PVC	003	120	.03	501.00	25.	.01	222
				.04	340.68	25.	.01	222
				.27	100.20	25.	.03	222
				.09	200.40	25.	.02	222
			500	.03	310.62	25.	.01	222
			501	.01	450.90	25.	.01	222

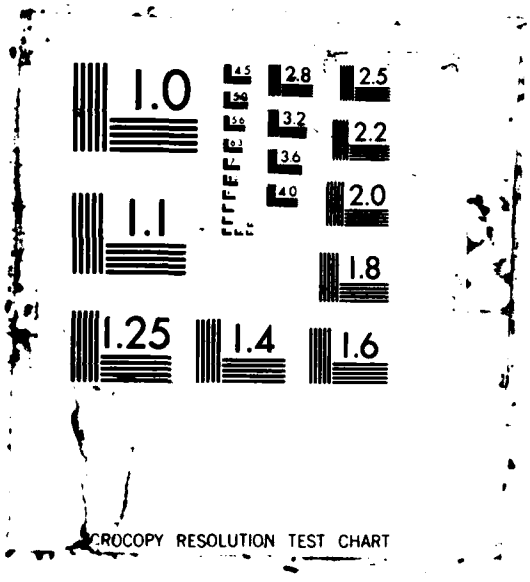
SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001108270	PVC	003	501	.04	300.60	25.	.02	222
		007	210	.55	216.43	23.		080
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.40	< .02	23.	.05	303
	VITON	009	118	> 7.00		23.	.02	323
				> 7.00		23.	.02	227
Cyclohexanol								
001089300	BUTYL	014	118	> 11.00		23.	.07	323
				> 11.00		23.	.04	227
	NATURAL RUBBER	001	210	.42	72.14	23.		080
		017	100	.25	9.02 - 90.18	23.	.05	107
	NEOPRENE	002	100	3.00	< .90	23.		107
			210	3.00	60.12	23.		080
		018	100	2.50	.90 - 9.02	23.	.04	107
			UNK	> 8.00		23.	.08	323
		031	511	- 8.00	******** - -1,669.98	23.	.01	323
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
			118	> 16.00		23.	.03	323
				> 16.00		23.	.04	227
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.25	.90 - 9.02	23.		107
	PE	076	100	> 6.00	< .90	23.		107
	PV ALCOHOL	004	100	6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	PVC	007	100	6.00	< .90	23.		107
			210	6.00	< .02	23.		080
		077	100	1.00	< .90	23.		107
				> 6.00	< .90	23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	118	> 8.00		23.	.03	323
				> 8.00		23.	.02	227
Cyclohexanone								
001089410	BUTYL	014	118	> 16.00		23.	.05	323
				> 16.00		23.	.04	227
	NEOP+NAT RUBBER	026	121	.28	132.26	23.	.05	23[illegible]
	NITRILE	019	118	.48	518.84	23.	.03	22[illegible]
	PV ALCOHOL	102	100	> 7.00		23.	.03	[illegible]
	SILVER SHIELD	122	118	> 6.00		23.	[illegible]	[illegible]
	VITON	009	118	.48	518.84	23	[illegible]	[illegible]
Cyclohexylamine								
001089180	BUTYL	014	118	2.93	290.58	[illegible]	[illegible]	[illegible]
	NATURAL RUBBER	001	250	.02	8.97[illegible]	[illegible]		[illegible]
	NEOPRENE	018	100	.60	[illegible]	[illegible]		
	NITRILE	019	100	1.02	[illegible]	[illegible]		
Decanal (all isomers)								
001123120	BUTYL	064	117	> 8.00				
				> 8.00				
				> 8.00				

AD-A179 164 GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING VOLUME 2 TEC.. (U) LITTLE (ARTHUR D) INC CAMBRIDGE MA A D SCHWOPE ET AL. FEB 87 USCG-D-8-87 2/3

UNCLASSIFIED DTCG23-85-F-20032 F/G 6/17 NL

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CROCOPY RESOLUTION TEST CHART

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
001123120	BUTYL/NEOPRENE	110	117		2.50			23.	.02	213
	NEOPRENE	093	117		4.00			23.	.02	213
		138	117	>	8.00			23.	.03	213
		139	117	>	8.00			23.	.02	213
	PE	076	117	>	8.00			23.	.01	213
	PVC	049	117	<	.08			23.	.01	213
	SARANEX	061	117	>	8.00			23.	.01	213
	VITON	145	117	>	8.00			23.	.01	213
	VITON/NEOPRENE	111	117	>	8.00			23.	.02	213
Diallyamine										
001240270	BUTYL	014	118		3.33		90.18	21.	.09	323
	PV ALCOHOL	004	100		7.08		20.04	23.	.08	323
	PVC	007	100		.02		2,364.72	22.	.02	323
	VITON	009	118		4.62			19.	.03	323
1,3-Diaminopropane										
001097620	BUTYL	014	118	>	8.00	<	.02	22.	.06	323
	NATURAL RUBBER	001	250		.05		440.88	25.	.02	323
	NEOPRENE	018	100		4.53		33.40	23.	.05	323
	PVC	007	100		.11		103.54	21.	.02	323
Di-n-amylamine										
020509220	NEOPRENE	018	100		2.15		110.22	16.	.05	323
	NITRILE	019	100	>	8.00	<	.02	20.	.04	323
	PVC	007	100		.12		280.56	13.	.02	323
	VITON	009	118	>	8.00	<	.02	16.	.03	323
Dibutylamine										
001119220	NITRILE	019	100	>	8.00	<	.02	24.	.04	323
	PV ALCOHOL	102	100	>	8.00	<	.02	23.	.08	323
	PVC	007	100		.05		741.48	20.	.02	323
	VITON	009	118	>	8.00	<	.02	20.	.03	323
Dichloroacetyl Chloride										
000793670	BUTYL	014	118		3.92		72.14	23.	.09	323
	PV ALCOHOL	102	100		3.47			23.	.07	323
	PVC	003	100		.03		438.88	23.	.02	323
	VITON	009	118	>	8.00			23.	.03	323
Dichlorobenzene										
253212260	CPE	070	UNK		.65			23.	.05	004
1,2-Dichlorobenzene										
000955010	NITRILE	005	229		.33		1,015.36	23.	.11	210
		019	120		.63		1,140.61	23.	.04	210
	VITON	009	118	>	4.00			23.	.03	210
1,3-Dichlorobenzene										
005417310	NITRILE	005	229		.28		1,130.59	23.	.11	210
		019	120		.50		1,157.31	23.	.04	210
	VITON	009	118	>	4.00			23.	.03	210

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Dichlorobromomethane								
000752740	BUTYL	014	118	.68	1,897.80	23.	.07	323
	PVC	007	100	.02	6,943.86	23.	.02	323
	VITON	009	118	7.83	.37	23.	.03	323
	VITON/BUTYL	100	102	1.78	.02	23.	.08	323
1,4-Dichloro-2-butene								
001105760	BUTYL	064	UNK	> 24.00		23.	.07	334
	CPE	060	UNK	.58	400.80	23.	.05	334
		070	UNK	.75		23.	.05	004
	NEOPRENE	002	UNK	1.10		22.	.12	333
				.77		22.	.10	333
				.22		22.	.08	333
				.17		22.	.07	333
				.57	118.24	22.	.11	333
				.36	51.10	22.	.08	333
				.45	31.06	23.	.10	335
				.68	27.05	23.	.12	335
				.80	27.05	23.	.14	335
		018	UNK	.49	126.25	22.	.05	333
				.37		22.	.05	333
				.35		22.	.05	333
				.26		22.	.04	333
				.23	41.08	22.	.05	333
				.30	38.08	23.	.04	335
		031	UNK	1.38	80.16	23.	.14	334
				.97	80.16	23.	.13	334
				1.23	121.24	23.	.13	334
		081	UNK	1.97	101.20	23.	.15	335
				3.35	40.08	23.	.18	335
				2.97	41.08	23.	.20	335
				1.60	121.24	23.	.14	335
				.92	113.23	23.	.14	335
	NITRILE	019	UNK	.43	156.31	23.	.04	335
				.33		22.	.04	333
				.27		22.	.04	333
				.33		22.	.04	333
				.44	156.31	22.	.04	333
		078	UNK	.04	330.66	23.	.03	334
	PE	006	UNK	> 24.00		23.	.01	334
		075	UNK	.04	33.07	23.	.03	334
		076	127	1.25		23.		104
			UNK	> 24.00		23.	.01	334
	PV ALCOHOL	004	UNK	> 83.33		22.	.09	333
	PVC	007	UNK	.37		22.	.11	333
				.58	72.14	22.	.11	333
				.52	108.22	22.	.10	333
				.58	87.17	22.	.11	333
				.60		22.	.12	333
				.58	31.06	23.	.10	335
				.50	30.06	23.	.11	335
		049	UNK	.10	380.76	23.	.05	334

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PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001105760	PVC	049	UNK	.05	370.74	23.	.04	334
				2.87	144.29	23.	.20	334
		053	UNK	.06	400.80	23.	.03	334
				.09	250.50	23.	.05	334
				.13	330.66	23.	.05	334
		077	UNK	.02	430.86	23.	.02	334
		083	UNK	6.43	81.16	23.	.26	335
				2.73	122.24	23.	.20	335
	SARANEX	061	UNK	> 24.00		23.	.02	334
	VITON	009	UNK	> 8.30		23.	.03	335
		090	UNK	> 24.00		23.	.02	334
Dichloroethane								
013002160	TEFLON	069	510	> 5.70	< .02	23.	.05	303
				> 3.00	< .02	25.	.05	303
cis-Dichloroethylene								
001565920	BUTYL	014	118	.32	2,925.84	23.	.07	323
	PV ALCOHOL	004	100	.08	3,547.08	23.	.05	323
	PVC	007	100	.02	3,316.62	23.	.02	323
	VITON	009	118	1.68	30.06	23.	.03	323
1,2-Dichloroethylene								
005405900	NITRILE	019	100	.12	781.56	29.	.04	323
	PV ALCOHOL	004	100	.23	.50	23.	.04	323
	PVC	007	100	< .01	841.68	23.	.02	323
	VITON	009	118	.95	50.10	23.	.03	323
trans-1,2-Dichloroethylene								
001566050	BUTYL	014	118	.13	14,739.42	23.	.06	323
	PV ALCOHOL	004	100	2.63	1,142.28	23.	.09	323
	PVC	007	100	.02	6,262.50	23.	.02	323
	VITON	009	118	1.18	20.04	23.	.03	323
2,2'-Dichloroethyl Ether								
001114440	CPE	060	113	1.20		23.	.05	204
				1.45	480.96	23.	.05	204
		070	UNK	1.33		23.	.05	004
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Dichloropropane (all isomers)								
266381970	CPE	070	UNK	.60		23.	.05	004
	TEFLON	069	510	> 3.10	< .02	23.	.05	303
Dichloropropane-Dichloropropene								
080031980	TEFLON	069	510	> 3.00	< .02	23.	.05	303
2,3-Dichloro-1-propene								
000788860	BUTYL	014	118	1.90	140.28	23.	.09	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.09	323
	PVC	007	100	.02	5,330.64	23.	.02	323
	VITON	009	118	> 8.00	< .02	23.	.03	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
1,3-Dichloropropene								
005427560	BUTYL	014	118	1.30	320.64	23.	.07	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.07	323
	PVC	007	100	.02	6,513.00	23.	.02	323
	VITON	009	118	> 8.00	< .02	23.	.03	323
Diethanolamine								
001114220	BUTYL	014	118	> 8.00		24.	.09	323
	NEOPRENE	018	100	> 8.00		22.	.05	323
	NITRILE	019	100	> 8.00		26.	.04	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 8.00		27.	.03	323
Diethylamine								
001098970	BUTYL	014	118	.78	460.92	23.	.09	323
	NATURAL RUBBER	001	103		534.40	23.		045
	NEOPRENE	125	103		396.79	23.		045
	NITRILE	019	100	.75	90.18 - 901.80	23.	.06	107
				.20	1,332.66	24.	.04	323
			103		583.16	23.		045
	PE	076	100	.08	90.18 - 901.80	23.		107
	PVC	007	100	.02	3,707.40	24.	.02	323
			103		414.83	23.		045
	SARANEX	061	127	.73	38.08	23.		104
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	.58	8,537.04	20.	.03	323
	VITON/CHLOROBUTYL	112	113	.45 - .50		25.	.04	302
Diethylaminoethanol								
001003780	BUTYL	014	118	> 8.00	< .02	22.	.07	323
	NITRILE	019	118	> 8.00	< .02	22.	.04	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.09	323
	VITON	009	118	> 8.00	< .02	22.	.03	323
Diethylenetriamine								
001114000	BUTYL	014	118	> 8.00	< .02	24.	.08	323
	NEOPRENE	018	100	> 8.00	< .02	22.	.05	323
	PVC	007	100	.63	3.01	22.	.02	323
	VITON	009	118	> 8.00	< .02	23.	.03	323
Diisobutylamine								
001109630	NEOPRENE	018	100	.87	138.28	22.	.05	323
	NITRILE	019	100	> 8.00		20.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.08	323
	VITON	009	118	> 8.00		22.	.02	323
Diisobutyl Ketone								
001088380	NATURAL RUBBER	001	210	.25	583.16	23.		080
	NEOPRENE	002	210	.25	450.90	23.		080
	NITRILE	005	210	4.75	30.06	23.		080
		019	100	2.00	90.18 - 901.80	23.	.06	107
	NITRILE+PVC	057	210	1.25	3.01	23.		080

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001088380	PE	076	100	.08	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	210	1.00	8.42	23.		080
Diisobutyl Ketone, >70%								
001088383	BUTYL	014	118	3.27	247.69	23.	.04	323
				3.30	247.69	23.	.04	227
	NITRILE	019	118	2.93	294.59	23.	.03	323
				3.00	293.99	23.	.03	227
	PV ALCOHOL	102	100	> 16.00		23.	.03	323
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	118	1.13	544.69	23.	.03	323
				1.20	544.69	23.	.02	227
Diisopropylamine								
001081890	NEOPRENE	018	100	.67	450.90	12.	.05	323
	NITRILE	019	100	3.25	90.18	10.	.04	323
	PVC	007	100	.03	1,322.64	11.	.02	323
	TEFLON	069	510	> 4.50	< .02	24.	.05	303
	VITON	009	118	> 8.00	< .02	12.	.03	323
N,N-Dimethylacetamide								
001271950	CPE	070	UNK	.67		23.	.05	004
	SARANEX	061	127	1.07	2.00	23.		104
Dimethylamine								
001244030	BUTYL	014	118	> 8.00	< .02	22.	.06	323
	NATURAL RUBBER	001	250	.03	80.16	20.	.02	323
	NEOPRENE	018	100	> 8.00	< .02	22.	.05	323
	PV ALCOHOL	102	100	.28	40.08	23.	.07	323
	PVC	007	100	.10	20.04	20.	.02	323
Dimethylaminopropylamine								
001095570	BUTYL	014	118	> 8.00	< .02	16.	.09	323
	NATURAL RUBBER	001	250	.01	2,114.22	16.	.02	323
	NEOPRENE	018	100	.48	470.94	20.	.05	323
	PVC	077	100	.03	2,189.37	20.	.02	323
alpha,alpha-Dimethylbenzyl Hydroperoxide								
000801590	TEFLON	069	510	> 3.50	< .02	23.	.05	303
Dimethylbutylamine								
001080980	BUTYL	014	118	1.68	320.64	24.	.06	323
	NITRILE	019	100	1.35	711.42	19.	.04	323
	PV ALCOHOL	102	100	.33	140.28	23.	.08	323
	PVC	007	100	.05	2,575.14	21.	.02	323
Dimethylethanolamine								
001080100	BUTYL	014	118	> 8.00	< .02	12.	.09	323
	NATURAL RUBBER	001	250	.08	100.20	19.	.02	323
	NEOPRENE	018	100	3.92	30.06	21.	.05	323
	NITRILE	019	100	> 8.00	< .02	9.	.04	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Dimethylformamide								
000681220	BUTYL	012	UNK	22.00	< .02	25.	.04	273
				23.00	< .02	25.	.04	273
				> 71.00	< .02	25.	.06	273
				> 71.00	< .02	25.	.06	273
				> 24.00	< .02	25.	.04	273
				> 24.00	< .02	25.	.04	273
				> 24.00	< .02	25.	.06	273
				> 24.00	< .02	25.	.06	273
				> 6.00	1.20	25.	.04	273
				> 6.00	1.20	25.	.04	273
				> 7.00	< -1,669.98	25.	.06	273
				> 7.00	< -1,669.98	25.	.06	273
		014	118	> 8.00		23.	.04	323
				> 8.00		23.	.04	227
		107	UNK	> 8.00		25.	.04	149
				> 8.00		25.	.04	149
				> 8.00		25.	.04	149
	NATURAL RUBBER	001	210	1.00	721.44	23.		080
		017	100	.50	90.18 - 901.80	23.	.05	107
	NEOP+NAT RUBBER	026	121	.62	66.13	23.	.05	237
	NEOPRENE	002	100	1.00	9.02 - 90.18	23.		107
			210	.13	96.19	23.		080
		018	100	.85	66.13	23.	.05	323
				.17	9.02 - 90.18	23.	.04	107
			UNK	3.00	1.20	25.	.04	273
				3.50	1.20	25.	.04	273
				> 5.50	< .02	25.	.06	273
				> 6.00	< .02	25.	.06	273
		031	UNK	.02	18.04	25.	.04	149
				.57	47.09	25.	.04	149
				1.10	74.15	25.	.04	149
				.10	20.04	25.	.04	149
		125	103		54.11	23.		045
	NITRILE	005	120	.58	54.11	23.	.06	236
			210	1.00	120.24	23.		080
		019	103		114.23	23.		045
			118	.15	90.18	23.	.04	323
				.22	> 90.18	23.	.04	227
			UNK	3.50	10.82	25.	.04	273
				3.50	12.02	25.	.04	273
				> 5.00	10.82	25.	.06	273
				> 5.00	10.22	25.	.06	273
	NITRILE+PVC	057	210	1.50	132.26	23.		080
	PE	076	100	.50	< .90	23.		107
	PV ALCOHOL	035	UNK	.08	900.80	25.	.07	149
				.37	1,057.78	25.	.07	149
				.33	48.10	25.	.07	149
				.12	2,191.37	25.	.07	149
		102	100	.33	78.16	23.	.04	323
				.20	24.65	23.	.03	323
	PVC	007	210	1.00	138.28	23.		080

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000681220	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 11.20	< .02	23.	.05	303
	VITON	009	118	.13	39.08	23.	.03	323
				.13	39.08	23.	.02	227
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
1,1-Dimethylhydrazine (Dimethylhydrazine,unsym-)								
000571470	BUTYL	014	118	> 1.50		23.	.03	001
				> 1.50		23.	.04	001
				> 1.50		23.	.08	001
		034	UNK	23.00 - 27.00	2.91	22.	.08	078
	CHLOROBUTYL	052	205	> 1.50		23.	.05	001
	CPE	060	113	.50		23.	.05	001
	NATURAL RUBBER	017	100	.17		23.	.04	001
				.23		23.	.05	001
				.06		23.	.02	001
				.18		23.	.04	001
				.06		23.	.02	001
			101	.10		23.	.05	001
			110	.22		23.	.05	001
	NEOP/NAT RUBBER	008	114	.03		23.	.04	001
				.15		23.	.04	001
				.15		23.	.04	001
	NEOPRENE	002	100	1.12		23.	.12	001
				> 1.50		23.	.13	001
		018	100	.63		23.	.05	001
		031	UNK	.42 - .67	450.90	22.	.08	078
	NITRILE	019	100	.15		23.	.04	001
				.23		23.	.04	001
				.10		23.	.03	001
			118	.12		23.	.03	001
	PV ALCOHOL	004	100	.13		23.	.09	001
	PVC	003	120	.22		23.	.05	001
				.68		23.	.10	001
				.03		23.	.03	001
		007	100	.47		23.	.09	001
				.58		23.	.11	001
				.28		23.	.10	001
		053	189	.05		23.	.06	001
				.16		23.	.07	001
				.33		23.	.05	001
		054	189	.53		23.	.05	001
				.02		23.	.05	001
		077	168	.08 - .17	190.38	22.	.04	078
			212	.08		23.	.03	001
	VITON	009	118	.20		23.	.03	001
Dimethyl Sulfoxide								
000676850	CPE	060	113	> 3.00		25.	.07	302
	NATURAL RUBBER	001	210	1.33	721.44	23.		080
			UNK	1.50 - 2.00		25.	.02	276
		017	100	> 1.00	< 10.02	25.	.03	222
				1.00	.90 - 9.02	23.	.05	107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000676850	NATURAL RUBBER	017	120	> 1.00	< 10.02	25.	.02	222
			203	> 1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.06	222
	NEOP/NAT RUBBER	008	114	4.00		25.	.05	276
	NEOPRENE	002	100	> 8.00		25.	.05	276
				> 3.00	9.02 - 90.18	23.		107
			120	> 1.00	< 10.02	25.	.07	222
			210	6.00	< .02	23.		080
			UNK	1.77		23.	.05	186
		018	100	> 6.00	< .90	23.	.04	107
			120	> 1.00	< 10.02	25.	.05	222
				1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.03	222
	NITRILE	005	210	4.33	5.41	23.		080
		019	100	> 1.00	< 10.02	25.	.04	222
				2.00 - 3.00		25.	.04	276
				> 4.00	.90 - 9.02	23.	.06	107
			191	.47	350.70	25.	.03	222
	NITRILE+PVC	057	210	1.33	4.81	23.		080
	PE	006	100	> 1.00	< 10.02	25.	.01	222
	PVC	003	120	.05	380.76	25.	.01	222
				.70	300.60	25.	.03	222
				.57	320.64	25.	.02	222
		007	100	1.17	.90 - 9.02	23.		107
			210	.83	6.01	23.		080
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
Dimethylvinylchloride								
005133710	NITRILE	019	100	.15	354.71	23.	.05	323
	PV ALCOHOL	004	100	1.18	6.01	23.	.08	323
	PVC	003	100	.02	420.84	23.	.02	323
	VITON	009	118	2.22	24.05	23.	.04	323
Di-n-octyl Phthalate								
001178400	NITRILE+PVC	058	100	.42		23.		107
	PE	076	100	.08		23.		107
	PVC	077	100	.42		23.		107
				> 6.00	< .90	23.		107
1,4-Dioxane (Diethylene Dioxide,1,4)								
001239110	BUTYL	014	118	> 20.00		23.	.07	323
				> 20.00		23.	.04	227
	NATURAL RUBBER	017	100	.15	420.84	25.	.03	222
				.08	90.18 - 901.80	23.	.05	107
			120	.04	801.60	25.	.02	222
			502	.20	340.68	25.	.05	222
			504	.17	280.56	25.	.05	222
				.45	150.30	25.	.06	222
	NEOP+NAT RUBBER	026	102	.28	340.68	25.	.05	222
	NEOP/NAT RUBBER	008	114	.30	220.44	25.	.05	222
	NEOPRENE	002	100	.14	220.44	25.	.08	222
			120	.09	330.66	25.	.07	222
		018	100	.27	560.92	23.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001239110	NEOPRENE	018	118	1.78	150.30	25.	.08	222
			120	.73	300.60	25.	.05	222
				.73	240.48	25.	.07	222
				.47	370.74	25.	.05	222
				.25	551.10	25.	.03	222
		125	103		360.72	23.		045
	NITRILE	019	100	.42	861.72	25.	.04	222
				1.05	3.01	25.	.06	222
				.45	821.64	25.	.04	222
			103		2,068.13	23.		045
			118	.40	463.53	23.	.04	323
				.47	463.53	23.	.04	227
			503	.28	711.42	25.	.03	222
	PE	006	100	.02	300.60	25.	.01	222
			505	.17	60.12	25.	.01	222
		076	100	.05	.90 - 9.02	23.		107
	PV ALCOHOL	102	100	> 16.00		23.	.03	323
	PVC	003	120	.03	3,707.40	25.	.01	222
				.01	4,008.00	25.	.01	222
				.11	1,503.00	25.	.03	222
				.06	1,102.20	25.	.02	222
			500	.02	5,010.00	25.	.01	222
			501	.02	3,807.60	25.	.01	222
				.02	4,008.00	25.	.02	222
		007	103		402.80	23.		045
	SARANEX	061	127	.83	17.43	23.		104
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 3.20	< .02	23.	.05	303
	VITON	009	118	.38	161.12	23.	.03	323
				.38	161.12	23.	.02	227
Dipropylamine								
001428470	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Divinyl Benzene								
013217400	BUTYL	014	118	2.22	1,430.86	23.	.05	323
				2.20	1,430.86	23.	.04	227
	NITRILE	019	100	1.00	2,703.60	23.	.04	323
	PV ALCOHOL	102	100	> 18.00		23.	.03	323
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	> 17.00		23.	.02	323
				> 17.00		23.	.02	227
Epichlorohydrin								
001068980	BUTYL	014	118	24.00		23.	.04	291
				24.00		23.	.04	291
				24.00		23.	.04	291
				24.00		23.	.04	291
				> 8.00	< -1,669.98	23.	.07	323
				> 8.00	< -1,669.98	23.	.07	323
		034	UNK	79.00	.20	22.	.08	078
	NATURAL RUBBER	001	250	< .02	504.34	23.	.02	323
				< .02	504.34	23.	.02	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001068980	NATURAL RUBBER	017	UNK	.05	130.26	23.	.02	291
				.06	138.28	23.	.02	291
	NEOPRENE	018	100	.33	362.72	23.	.04	291
				.25	314.63	23.	.04	291
		031	UNK	1.00 - 1.33	110.22	22.	.08	078
	NITRILE	020	503	.42	1,252.50	23.	.04	291
				.33	1,152.30	23.	.04	291
	PE	006	100	.05	9.45	23.	.01	291
				.05	9.74	23.	.01	291
	PV ALCOHOL	035	UNK	< .08	130.26	22.	.01	078
		102	100	.05	127.25	23.	.05	291
				.02	105.21	23.	.05	291
				5.82	.30	23.	.07	323
				5.82	.30	23.	.07	323
	SARANEX	061	127	1.00	3.32	23.	.02	291
				1.00	3.44	23.	.02	291
				.95	52.30	23.		104
	TEFLON	036	214	7.00	.02	23.	.01	291
				7.00	.02	23.	.01	291
		069	510	> 3.40	< .02	23.	.05	303
	VITON	009	118	1.00	51.20	23.	.02	291
				1.00	51.90	23.	.02	291
				1.00	50.70	23.	.02	291
				2.05	6.13	23.	.03	323
				2.05	6.13	23.	.03	323
1,2-Epoxybutane								
001068870	BUTYL	014	118	.75	20.04	23.	.06	323
	NEOPRENE	018	100	.07	20.04	23.	.05	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.04	323
	VITON	009	118	.03	20.04	23.	.03	323
Ethanolamine (Aminoethanol,2)								
001414350	BUTYL	014	118	> 8.00		26.	.07	323
	NATURAL RUBBER	001	210	4.50	6.61	23.		080
		017	100	3.50	.90 - 9.02	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
			210	6.00	< .02	23.		080
		018	100	> 6.00	< .90	23.	.04	107
				> 8.00		20.	.05	323
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	057	210	5.00	4.21	23.		080
		058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PV ALCOHOL	004	100	2.50	.90 - 9.02	23.		107
	PVC	007	100	> 6.00	< .90	23.		107
				> 8.00		25.	.02	323
			210	2.00	7.82	23.		080
		077	100	> 6.00		23.		107
				> 6.00		23.		107
	VITON	009	118	> 8.00		22.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Ethyl Acetate								
001417860	BUTYL	014	118	7.60	20.44	23.	.04	227
	CPE	060	113	.97 - 1.17		25.	.07	302
	NATURAL RUBBER	001	210	.18	54.11	23.		080
		017	100	.08	9.02 - 90.18	23.	.05	107
	NEOPRENE	002	100	.33	9.02 - 90.18	23.		107
			210	.20	48.10	23.		080
		018	100	.25	9.02 - 90.18	23.	.04	107
	NITRILE	005	210	.50	66.13	23.		080
		019	118	.13	871.74	23.	.04	227
	NITRILE+PVC	057	210	.50	48.10	23.		080
	PE	076	100	.07	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	210	.33	78.16	23.		080
	SARANEX	061	127	.60	6.61	23.		104
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.10	< .02	23.	.05	303
				> 4.30	< .02	24.	.05	303
	VITON/CHLOROBUTYL	112	113	.33 - .66		25.	.04	302
Ethyl Cellosolve (Ethoxyethanol, 2)								
001108050	BUTYL	014	118	> 8.00		23.	.06	323
				> 8.00		23.	.08	323
	NATURAL RUBBER	001	103		1.20	23.		045
			250	.02	72.14	23.	.02	323
			506	< .01	49.30	23.	.01	323
	NEOPRENE	018	100	4.08	18.64	23.	.06	323
		125	103		6.01	23.		045
	NITRILE	019	100	1.53	56.51	23.	.04	323
			103		54.11	23.		045
	PV ALCOHOL	102	100	.05	132.26	23.	.08	323
	PVC	007	100	.07	162.32	23.	.02	323
			103		6.01	23.		045
Ethyl Acrylate								
001408850		250	250	.02	1,040.08	23.	.02	323
	BUTYL	014	118	> 8.00		23.	.09	323
		064	117	.67		23.	.02	213
				.88		23.	.01	213
				.67		23.	.02	213
	BUTYL/NEOPRENE	110	117	1.00		23.	.02	213
	CPE	060	113	1.08 - 1.17		25.	.07	302
			UNK	.50		23.		142
				1.42		23.		142
		070	UNK	.40		23.	.05	004
	NEOPRENE	093	117	< .08		23.	.02	213
		138	117	.08		23.	.03	213
		139	117	< .25		23.	.02	213
	PE	076	117	< .08		23.	.01	213
	PV ALCOHOL	102	100	> 8.00		23.	.08	323
	PVC	003	100	.03	1,040.08	23.	.02	323
		049	117	.05		23.	.01	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001408850	SARANEX	061	117	1.33		23.	.01	213
	TEFLON	069	510	> 17.00	< .02	23.	.05	303
	VITON	145	117	< .08		23.	.01	213
	VITON/CHLOROBUTYL	112	113	.23 - .53		25.	.04	302
			UNK	> 3.00		23.		142
	VITON/NEOPRENE	111	117	.20		23.	.02	213
Ethyl Alcohol (Ethanol)								
000641750	NATURAL RUBBER	001	210	1.50	6.01	23.		080
		017	100	.47	4.01	25.	.03	222
				.50	.90 - 9.02	23.	.05	107
			120	.20	14.03	25.	.02	222
			502	> 1.00	< 4.01	25.	.05	222
			504	> 1.00	< 4.01	25.	.05	222
				> 1.00	< 4.01	25.	.06	222
	NEOP+NAT RUBBER	026	121	.37	> .33	23.	.05	237
	NEOP/NAT RUBBER	008	114	> 1.00	< 4.01	25.	.05	222
	NEOPRENE	002	100	3.00	.90 - 9.02	23.		107
				> 1.00	< 4.01	25.	.08	222
			120	> 1.00	< 4.01	25.	.07	222
			210	2.00	3.01	23.		080
		018	100	1.50	.90 - 9.02	23.	.04	107
			118	> 1.00	< 4.01	25.	.08	222
			120	> 1.00	< 4.01	25.	.05	222
				> 1.00	< 4.01	25.	.07	222
				> 1.00	< 4.01	25.	.05	222
				> 1.00	< 4.01	25.	.03	222
		031	511	- .82	- 1.80	23.		323
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 1.00	< 4.01	25.	.04	222
				4.00	.90 - 9.02	23.	.06	107
				> 1.00	< 4.01	25.	.06	222
				> 1.00	< 4.01	25.	.04	222
			503	> 1.00	< 4.01	25.	.03	222
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.25	.90 - 9.02	23.		107
	PE	006	505	> 1.00	< 4.01	25.	.01	222
		076	100	.05	> 9,018.00	23.		107
	PV ALCOHOL	004	100	1.67	55.11	23.		123
				1.67	5.51	21.		124
	PVC	003	120	.05	43.09	25.	.01	222
				.08	37.07	25.	.01	222
				.33	28.06	25.	.03	222
				.18	43.09	25.	.02	222
			500	.06	28.06	25.	.01	222
			501	.05	34.07	25.	.01	222
				.03	57.11	25.	.02	222
		007	100	1.00	.90 - 9.02	23.		107
			210	2.50	6.01	23.		080
		077	100	.25	< .90	23.		107
				.50	.90 - 9.02	23.		107
	TEFLON	069	510	> 3.00	< .02	23.	.05	303

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Ethylamine, 30-70%								
000750472	BUTYL	014	118	> 12.00	< -1,669.98	23.	.04	227
	NITRILE	019	118	1.10	180.96	23.	.04	227
	SILVER SHIELD	122	118	.47	36.07	23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Ethyl Benzene								
001004140	PV ALCOHOL	102	100	.55		23.	.08	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Ethyl Bromide								
000749640	NEOPRENE	018	100	.07	1,322.64	23.	.04	323
	PV ALCOHOL	102	100	1.07	.42	23.	.08	323
	PVC	003	100	< .02	2,104.20	23.	.02	323
	VITON	009	118	1.43	30.06	23.	.04	323
Ethyl-n-butylamine								
133606390	NITRILE	019	100	1.22	210.42	24.	.04	323
	PV ALCOHOL	102	100	6.72	20.04	23.	.09	323
	PVC	007	100	.06	2,648.62	24.	.02	323
	VITON	009	118	3.80	1,482.96	23.	.03	323
Ethyl Cyanide (Propionitrile)								
001071200	BUTYL	014	118	.40	167.73	23.	.06	323
	NATURAL RUBBER	001	506	< .01	79.36	23.	.01	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	PVC	003	100	< .01	18.04	23.	.02	323
Ethylene Chlorohydrin (Chloroethanol)								
001070730	BUTYL	014	118	> 8.00	< .02	23.	.06	323
	NEOPRENE	018	100	4.98	.70	23.	.05	323
	PV ALCOHOL	102	100	1.85	20.04	23.	.09	323
	VITON	009	118	> 8.00	< .02	23.	.05	323
Ethylenediamine (Diaminoethane,1,2)								
001071530	BUTYL	014	118	> 8.00	< .02	18.	.07	323
	CPE	060	113	2.00		23.	.05	204
				2.67	36.07	23.	.05	204
	NATURAL RUBBER	001	250	.08	501.00	20.	.01	323
	NEOPRENE	018	100	6.65	20.04	18.	.05	323
	PE	076	127	.25	10.22	23.		104
	PVC	007	100	.17	80.16	16.	.02	323
	SARANEX	061	127	> 8.00	< .02	23.		104
	TEFLON	069	510	> 3.20	< .02	23.	.05	303
Ethylene Dibromide (Dibromoethane,1,2)								
001069340	BUTYL	014	118	1.70	75.15	23.	.04	291
				1.83	79.16	23.	.04	291
				3.33	36.07	23.	.07	323
		064	117	.55		23.	.02	213
				.38		23.	.01	213
				.38		23.	.02	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001069340	BUTYL/NEOPRENE	110	117	< .08		23.	.02	213
	CPE	070	UNK	.73		23.	.05	004
	NATURAL RUBBER	017	UNK	< .02	> 731.46	23.	.02	291
				< .02	> 731.46	23.	.02	291
	NEOPRENE	018	100	.13	> 731.46	23.	.04	291
				.20	> 731.46	23.	.04	291
		093	117	< .33		23.	.02	213
		125	103		354.71	23.		045
		139	117	.08		23.	.02	213
	NITRILE	019	103		583.16	23.		045
		020	503	.58	> 731.46	23.	.04	291
				.45	> 731.46	23.	.04	291
	PE	006	100	< .03	158.32	23.	.01	291
				< .03	141.28	23.	.01	291
		076	117	.75		23.	.01	213
	PV ALCOHOL	102	100	> 24.00		23.	.05	291
				> 24.00		23.	.05	291
				> 8.00		23.	.08	323
	PVC	007	100	.03	1,406.81	23.	.02	323
			103		294.59	23.		045
		049	117	.12		23.	.01	213
	SARANEX	061	117	.55		23.	.01	213
			127	.17	49.10	23.	.02	291
				.13	49.10	23.	.02	291
	TEFLON	036	214	1.00		23.	.01	291
				> 24.00		23.	.01	291
				> 24.00		23.	.01	291
		069	510	> 3.40	< .02	23.	.05	303
	VITON	009	118	> 24.00		23.	.02	291
				> 24.00		23.	.02	291
				> 8.00		23.	.03	323
		145	117	.58		23.	.01	213
	VITON/NEOPRENE	111	117	1.08		23.	.02	213
Ethylene Dichloride (Dichloroethane,1,2)								
001070620	BUTYL	014	118	2.98	531.06	23.	.06	323
				2.90	318.64	23.	.04	227
			UNK	2.33		23.	.06	326
		064	UNK	1.17		23.	.04	326
	CPE	070	UNK	.25		23.	.05	004
	NATURAL RUBBER	001	250	.01	350.70	23.	.02	323
		017	100	.01	1,603.20	25.	.03	222
			120	.02	3,106.20	25.	.02	222
			502	.08	1,302.60	25.	.05	222
			504	.06	2,505.00	25.	.05	222
				.16	801.60	25.	.06	222
			UNK	.03		23.	.02	326
	NEOP+NAT RUBBER	026	102	.08	1,302.60	25.	.05	222
	NEOP/NAT RUBBER	008	114	.01	1,302.60	25.	.05	222
	NEOPRENE	002	100	.03	701.40	25.	.08	222
			120	.04	801.60	25.	.07	222
		018	118	.70	501.00	25.	.08	222
			120	.27	701.40	25.	.05	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001070620	NEOPRENE	018	120	.47	801.60	25.	.07	222
				.14	1,002.00	25.	.05	222
				.06	1,803.60	25.	.03	222
			UNK	.33		23.	.06	326
	NITRILE	019	100	.11	3,807.60	25.	.04	222
				.28	2,605.20	25.	.06	222
				.12	3,907.80	25.	.04	222
			118	.13	1,869.73	23.	.04	227
			503	.08	3,907.80	25.	.03	222
			UNK	.04		23.	.02	326
		020	UNK	.04		23.	.03	326
	PE	006	100	.02	10.02	25.	.01	222
			505	.09	10.02	25.	.01	222
		042	UNK	.04		23.	.01	326
		076	100	.05	.90 - 9.02	23.		107
	PV ALCOHOL	004	100	> 3.00	.90 - 9.02	23.		107
				> 8.00	< .02	23.	.03	323
		102	100	> 8.00		23.	.04	323
				5.50		23.	.05	323
			UNK	.37		23.	.04	326
	PVC	003	120	.01	11,022.00	25.	.01	222
				.01	9,719.40	25.	.01	222
				.03	4,509.00	25.	.03	222
				.02	6,913.80	25.	.02	222
			500	.01		25.	.01	222
			501	.01	13,026.00	25.	.01	222
				.01	7,815.60	25.	.02	222
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	036	UNK	> 24.00		23.	.01	326
		044	UNK	1.50		23.	.01	326
	VITON	009	118	6.90	4.88	23.	.02	227
				> 8.00	< .02	23.	.03	323
			UNK	13.67		23.	.03	326
Ethylene Glycol								
001072110	NATURAL RUBBER	001	210	6.00	< .02	23.		080
		017	100	> 1.00	< 10.02	25.	.03	222
				> 6.00	< .90	23.	.05	107
			120	> 1.00	< 10.02	25.	.02	222
			502	> 1.00	< 10.02	25.	.05	222
			504	> 1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.06	222
	NEOP+NAT RUBBER	026	102	> 1.00	< 10.02	25.	.05	222
			121	> 8.00	< .02	23.	.05	237
	NEOP/NAT RUBBER	008	114	> 1.00	< 10.02	25.	.05	222
	NEOPRENE	002	100	> 6.00	< .90	23.		107
				> 1.00	< 10.02	25.	.08	222
			210	6.00	< .02	23.		080
		018	100	> 6.00	< .90	23.	.04	107
			118	> 1.00	< 10.02	25.	.08	222
			120	> 1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.07	222
				> 1.00	< 10.02	25.	.05	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001072110	NEOPRENE	018	120	> 1.00	< 10.02	25.	.03	222
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 1.00	< 10.02	25.	.04	222
				> 6.00	< .90	23.	.06	107
				> 1.00	< 10.02	25.	.04	222
			503	> 1.00	< 10.02	25.	.03	222
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	> 6.00	< .90	23.		107
	PE	006	100	> 1.00	< 10.02	25.	.01	222
			505	> 1.00	< .10	25.	.01	222
		076	100	> 6.00	< .90	23.		107
	PV ALCOHOL	004	100	2.00	.90 - 9.02	23.		107
	PVC	003	120	> 1.00	< 10.02	25.	.01	222
				> 1.00		25.	.01	222
				> 1.00	< 10.02	25.	.03	222
				> 1.00	< 10.02	25.	.02	222
			500	> 1.00	< 10.02	25.	.01	222
			501	> 1.00	< 10.02	25.	.01	222
				> 1.00	< 10.02	25.	.02	222
		007	100	> 6.00	< .90	23.		107
			210	6.00	< .02	23.		080
		077	100	.75	.90 - 9.02	23.		107
				> 6.00	< .90	23.		107
	TEFLON	069	510	> 16.80	< .02	23.	.05	303
Ethylene Oxide (Oxirane)								
000752180	NITRILE	019	103		.37	23.		045
Ethylenimine (Aziridine)								
001515640	BUTYL	034	UNK	10.00 - 16.00	4.51	22.	.08	078
	NEOPRENE	010	120	< .08		22.	.02	078
Ethyl Ether								
000602970	BUTYL	014	118	.13	554.31	23.	.04	227
	NATURAL RUBBER	001	210	.17	1,563.12	23.		080
	NEOPRENE	002	100	.17	9.02 - 90.18	23.		107
			210	.20	1,232.46	23.		080
		018	100	.17	9.02 - 90.18	23.	.04	107
		125	103		330.66	23.		045
	NITRILE	005	210	2.30	84.17	23.		080
		019	100	2.00	9.02 - 90.18	23.	.06	107
			103		264.53	23.		045
			118	.23	131.06	23.	.04	227
	NITRILE+PVC	057	210	.42	1,863.72	23.		080
	PE	076	100	.03	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 8.00		23.	.04	323
	PVC	007	210	.33	2,104.20	23.		080
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
				> 3.00	< .02	23.	.05	303
	VITON	009	118	.20	129.26	23.	.03	323
				.20	129.26	23.	.02	227

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000602970	VITON/CHLOROBUTYL	112	113	.02 - .17		25.	.04	302
2-Ethylhexanoic Acid								
001495750	NEOPRENE	018	100	> 4.00		23.	.05	123
	NITRILE	019	100	> 4.00		23.	.04	123
	PVC	003	215	> 4.00		23.	.04	123
2-Ethyl-1-Hexanol								
001047670	BUTYL	014	118	> 8.00		23.	.07	323
	NEOPRENE	018	100	> 8.00		23.	.05	323
	PV ALCOHOL	102	100	> 8.00		23.	.09	323
	VITON	009	118	> 8.00		23.	.03	323
Ethylidene Dichloride (Dichloroethane,1,1)								
000753430	BUTYL	012	118	1.52	186.37	23.	.09	323
	PV ALCOHOL	004	100	2.73		23.	.08	323
	PVC	003	100	.02	1,902.46	23.	.02	323
				.03	1,929.85	23.	.02	323
	VITON	009	118	2.43	36.07	23.	.04	323
Ethyl Methacrylate								
000976320	BUTYL	014	118	6.57	12.02	23.	.09	323
	CPE	070	UNK	.53		23.	.05	004
	NITRILE	019	100	.38	186.37	23.	.05	323
	PV ALCOHOL	102	100	> 8.00		23.	.06	323
	PVC	003	100	.03	84.17	23.	.02	323
Formaldehyde, <37% (Formalin)								
000500000	BUTYL	014	118	> 16.00		23.	.04	323
				> 16.00		23.	.04	227
	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	001	506	.20	.02	23.	.02	323
		017	100	1.00	.90 - 9.02	23.	.05	107
			UNK	.10	3.34	26.	.02	148
	NEOPRENE	002	100	2.00	.90 - 9.02	23.		107
		018	100	2.00	< .90	23.	.04	107
		125	103		< .02	23.		045
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
			103		< .02	23.		045
			118	> 21.00		23.	.04	323
				> 21.00		23.	.04	227
			UNK	> 6.00	< .02	26.	.03	148
	NITRILE+PVC	058	100	.50	.90 - 9.02	23.		107
	PE	076	100	> 6.00	< .90	23.		107
			127	> 8.00	< .02	23.		104
	PVC	003	100	.07	.05	23.	.02	323
		007	100	1.33	.90 - 9.02	23.		107
			103		< .02	23.		045
		077	100	.33	.90 - 9.02	23.		107
				6.00	9.02 - 90.18	23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 16.00		23.	.02	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000500000	VITON	009	118	> 16.00		23.	.02	227
Formic Acid (Methanoic Acid)								
000641860	PE	076	127	.07	.03	23.		104
Formic Acid, >70%								
000641863	NATURAL RUBBER	017	100	2.00		23.	.05	107
	NEOP+NAT RUBBER	026	121	3.20	12.02	23.	.05	237
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	4.00		23.	.06	107
	NITRILE+PVC	058	100	.50		23.		107
	PE	076	100	.20		23.		107
	PVC	007	100	> 6.00		23.		107
		077	100	.67		23.		107
				1.25		23.		107
Freon TF								
000761310	NATURAL RUBBER	017	100	.15	1,002.00	25.	.03	222
			120	.04	3,006.00	25.	.02	222
			502	.28	821.64	25.	.05	222
			504	.27	701.40	25.	.05	222
				.48	591.18	25.	.06	222
	NEOP+NAT RUBBER	026	102	.27	701.40	25.	.05	222
			121	.27	474.95	23.	.05	237
	NEOP/NAT RUBBER	008	114	.27	791.58	25.	.05	222
	NEOPRENE	002	100	2.00	.90 - 9.02	23.		107
				> 1.00	< 10.02	25.	.08	222
			120	3.00	20.04	25.	.07	222
		018	100	4.00	< .90	23.	.04	107
			118	> 1.00	< 10.02	25.	.08	222
			120	> 1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.07	222
				> 1.00	< 10.02	25.	.05	222
				> 1.00	< 10.02	25.	.03	222
	NITRILE	019	100	> 1.00	< 10.02	25.	.04	222
				> 6.00	< .90	23.	.06	107
				> 1.00	< 10.02	25.	.06	222
				> 1.00	< 10.02	25.	.04	222
			503	> 1.00	< 10.02	25.	.03	222
	NITRILE+PVC	058	100	.25	90.18 - 901.80	23.		107
	PE	006	100	.08	10.02	25.	.01	222
			505	> 1.00	< 1.00	25.	.01	222
		076	100	.13	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	.50	.90 - 9.02	23.		107
	PVC	003	120	.04	3,406.80	25.	.01	222
				.09	2,204.73	25.	.01	222
				.18	190.38	25.	.03	222
				.13	240.48	25.	.02	222
			500	.04	2,605.20	25.	.01	222
			501	.04	3,006.00	25.	.01	222
				.05	1,903.80	25.	.02	222
		077	100	.30	9.02 - 90.18	23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000761310	PVC	077	100	1.00	9.02 - 90.18	23.		107
Freon TMC								
577623190	NATURAL RUBBER	017	100	.05	901.80 - 9,018.00	23.	.05	107
	NEOPRENE	002	100	.17	90.18 - 901.80	23.		107
		018	100	.05	901.80 - 9,018.00	23.	.04	107
	NITRILE	019	100	.17	901.80 - 9,018.00	23.	.06	107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
Furan (Furfuran)								
001100090	BUTYL	014	118	1.35	60.12	23.	.09	323
	PV ALCOHOL	102	100	1.89	.08	23.	.09	323
	PVC	003	100	.02	2,951.89	23.	.02	323
	VITON	009	118	.33	138.28	23.	.05	323
Furfural								
000980110	BUTYL	014	118	> 16.00		23.	.04	323
				> 16.00		23.	.04	227
	NATURAL RUBBER	001	210	.25	30.06	23.		080
		017	100	.25	9.02 - 90.18	23.	.05	107
	NEOPRENE	002	100	2.00	9.02 - 90.18	23.		107
			210	.50	18.04	23.		080
		018	100	.33	9.02 - 90.18	23.	.04	107
	NITRILE	005	210	.92	156.31	23.		080
		019	118	.40	1,591.38	23.	.03	323
				.47	1,593.18	23.	.04	227
	NITRILE+PVC	057	210	.67	144.29	23.		080
	PE	076	100	.08	< .90	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	PVC	007	210	1.17	108.22	23.		080
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 1.00	< .02	23.	.05	303
	VITON	009	118	3.50	88.98	23.	.03	323
				3.60	88.98	23.	.02	227
Gasoline								
080066190	BUTYL	064	117	.58		23.	.02	213
	BUTYL/NEOPRENE	110	117	.33		23.	.02	213
	NEOP+NAT RUBBER	026	121	.07	1,076.15	23.	.05	237
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	.08	90.18 - 901.80	23.		107
	PE	076	100	.05	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	077	100	.07	9.02 - 90.18	23.		107
				.08	90.18 - 901.80	23.		107
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Glutaraldehyde								
001113080	BUTYL	014	118	> 8.00	< .02	23.	.09	323
	NEOPRENE	018	100	> 8.00	< .02	23.	.05	323
	PVC	003	100	1.17	6.01	23.	.02	323
	VITON	009	118	> 8.00	< .02	23.	.04	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Halothane								
001516770	BUTYL	014	118	3.07	138.28	23.	.09	323
	PV ALCOHOL	102	100	> 8.00		23.	.07	323
	PVC	007	100	.03	4,064.11	23.	.02	323
	VITON	009	118	.62	432.86	23.	.05	323
Heptane								
001428250	NATURAL RUBBER	001	210	.10	703.07	23.		080
			UNK	.02	> 521.04	23.	.12	274
		017	UNK	.03	> 531.06	23.	.04	274
	NEOP/NAT RUBBER	008	UNK	.08	> 526.05	23.	.05	274
	NEOPRENE	002	210	.75	499.00	23.		080
		018	UNK	> 1.00		23.	.06	274
				> 1.00		23.	.09	274
	NITRILE	005	210	6.00	< .02	23.		080
		019	UNK	> 1.00		23.	.05	274
				> 1.00		23.	.05	274
	NITRILE+PVC	057	210	3.00	18.04	23.		080
	PVC	007	210	.50	180.36	23.		080
			UNK	.25	> 450.90	23.	.16	274
	VITON	009	UNK	> 1.00		23.	.03	274
Hexachlorocyclopentadiene								
000774740	BUTYL	014	118	> 8.00	< .02	23.	.06	323
	NITRILE	019	100	> 8.00	< .02	23.	.04	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.08	323
	VITON	009	118	> 8.00	< .02	23.	.03	323
Hexamethylphosphoamide								
006803190	BUTYL	034	UNK	1.00 - 1.50	.02	22.	.08	078
	NITRILE	033	UNK	1.00 - 1.50	13.03	22.	.09	078
	PE	006	209	.25 - .42	4.01	22.	.01	078
Hexane								
001105430	BUTYL	012	UNK	.13	> 2,344.68	25.	.04	273
				.17	1,923.84	25.	.04	273
				.33	1,833.66	25.	.06	273
				.42	1,238.47	25.	.06	273
				.03	> 2,344.68	25.	.04	273
				.17	2,314.62	25.	.04	273
				.50	1,370.74	25.	.06	273
				.50	1,226.45	25.	.06	273
				.12	> 2,344.68	25.	.04	273
				.17	> 2,344.68	25.	.04	273
				.33	1,172.34	25.	.06	273
				.33	1,490.98	25.	.06	273
		014	UNK	.04	256.11	25.		287
		107	UNK	.35		23.	.04	094
				.17		45.	.04	094
	CPE	060	113	> 3.00		25.	.07	302
	NATURAL RUBBER	001	210	.08	751.50	23.		080
	NEOPRENE	002	100	1.50	9.02 - 90.18	23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001105430	NEOPRENE	002	210	.67	576.15	23.		080
			UNK	.86		23.	.05	186
				.06	27.66	25.		287
		018	100	.75	.03	23.	.05	323
				.75	90.18 - 901.80	23.	.04	107
			UNK	1.00	121.44	25.	.04	273
				1.00	75.15	25.	.04	273
				1.00	91.38	25.	.06	273
				1.00	52.91	25.	.06	273
		031	UNK	.33		37.	.04	187
		125	103		12.02	23.		045
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 4.00		23.	.04	323
				> 6.00	< .90	23.	.06	107
			103		6.01	23.		045
			UNK	> 7.00	< .02	25.	.04	273
				> 18.00	< .02	25.	.04	273
				> 17.00	< .02	25.	.06	273
				> 17.00	< .02	25.	.06	273
		033	UNK	1.31		37.	.05	187
	NITRILE+PVC	057	210	1.50	42.08	23.		080
		058	100	.07	90.18 - 901.80	23.		107
	PE	056	UNK	.07		37.	.01	187
		076	100	.01	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
			UNK	> 8.17		25.		287
		102	100	> 14.00		23.	.03	323
	PVC	007	103		90.18	23.		045
			210	.42	270.54	23.		080
			UNK	.31		23.	.05	186
				.62		23.	.07	186
		049	UNK	.48		37.	.03	187
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 5.00	< .02	23.	.05	303
				> 5.00	< .02	23.	.05	303
	VITON	009	118	> 11.00		23.	.02	323
				> 11.00		23.	.02	227
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
				> 3.00		25.	.04	302
Hydrazine (Diamine)								
003020120	BUTYL	014	118	> 8.00		23.	.04	323
	NEOPRENE	018	100	> 16.00		23.	.05	323
	NITRILE	019	118	> 8.00		23.	.04	323
	PVC	003	100	> 8.00		23.	.03	323
Hydrazine, 30-70%								
003020122	BUTYL	014	118	> 8.00	< .02	23.	.04	227
	NATURAL RUBBER	017	100	> 6.00	< .90	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
			118	> 8.00	< .02	23.	.04	227

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
003020122	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	100	> 6.00	< .90	23.		107
		077	100	> 6.00		23.		107
				> 6.00		23.		107
	SILVER SHIELD	122	118	2.10	6.01	23.	.01	227
Hydrochloric Acid								
076470100	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	001	210	6.00	< .02	23.		080
	NEOP+NAT RUBBER	026	121	4.42	12.02	23.	.05	237
	NEOPRENE	002	210	6.00	< .02	23.		080
		093	117	> 8.00		23.	.02	213
		138	117	> 8.00		23.	.03	213
	NEOPRENE+PVC	127	117	> 8.00		23.	.02	213
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	117	1.75		23.	.01	213
	PVC	007	210	6.00	< .02	23.		080
		049	117	> 8.00		23.	.01	213
				> 8.00		23.	.01	213
		053	117	5.17		23.	.02	213
		077	117	< 5.00		23.	.01	213
				2.92		23.	.01	213
		144	117	4.33		23.	.02	213
	SARANEX	061	117	5.00		23.	.01	213
	VITON	145	117	> 8.00		23.	.02	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Hydrochloric Acid, <30%								
076470101	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
			102	> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 8.00		23.	.06	026
				> 8.00		23.	.04	026
				> 8.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 8.00		23.		026
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	100	> 6.00		23.		107
		077	100	> 6.00		23.		107
				> 6.00		23.		107
Hydrochloric Acid, 30-70%								

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
076470102	NATURAL RUBBER	001	UNK	> 1.00		23.		052
		015	UNK	> 1.00		23.	.04	052
		017	100	> 5.00		23.	.05	107
			102	> 8.00		23.	.05	026
				5.50		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 2.50		23.	.06	026
				> 8.00		23.	.04	026
				> 8.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 8.00		23.		026
			UNK	> 1.00		23.		052
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
			UNK	> 1.00		23.	.06	052
	NITRILE	019	100	> 6.00		23.	.06	107
			UNK	> 1.00		23.	.05	052
	PE	076	127	.58		23.		104
	PVC	003	UNK	.40		23.	.02	052
		007	100	> 5.00		23.		107
			UNK	> 1.00		23.		052
	SARANEX	061	127	> 46.67	< .02	23.		104
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	UNK	> 1.00		23.	.03	052
Hydrochloric Acid, >70%								
076470103	NATURAL RUBBER	017	102	> 6.00		23.	.05	026
				5.50		23.	.05	026
				> 6.00		23.	.05	026
				5.50		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 2.50		23.	.06	026
				5.50		23.	.04	026
				> 6.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 6.00		23.		026
Hydrocyanic Acid								
000749080	BUTYL	034	UNK	1.00	< .02	*****	.04	148
	PE	076	UNK	1.00	.12	*****	.02	148
	PVC	049	UNK	.50	.28	*****	.08	148
Hydrofluoric Acid (Hydrogen Fluoride)								
076643930	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				7.08		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	NEOPRENE	093	117	> 8.00		23.	.02	213
		138	117	4.25		23.	.03	213
		139	117	> 8.00		23.	.02	213
	NEOPRENE+PVC	127	117	3.50		23.	.02	213
	NITRILE+PVC	058	117	1.08		23.	.01	213
	PE	076	117	1.50		23.	.01	213
	PVC	049	117	> 8.00		23.	.01	213
				2.17		23.	.01	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
076643930	PVC	053	117	2.08		23.	.02	213
				1.67		23.	.02	213
		077	117	< .08		23.	.01	213
				.92		23.	.01	213
		144	117	.42		23.	.02	213
	SARANEX	061	117	3.17		23.	.01	213
	VITON	145	117	> 8.00		23.	.01	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Hydrofluoric Acid, 30-70%								
076643932	NATURAL RUBBER	017	100	3.50		23.	.05	107
			102	> 8.00		23.	.05	026
				1.50		23.	.05	026
				> 8.00		23.	.05	026
				4.50		23.	.05	026
	NEOP+NAT RUBBER	026	102	3.00		23.	.06	026
				3.50		23.	.04	026
				> 8.00		23.	.05	026
			121	> 8.00	< .02	23.	.05	237
	NEOP/NAT RUBBER	008	102	> 8.00		23.		026
	NEOPRENE	002	100	1.25		23.		107
		018	100	1.00		23.	.04	107
	NITRILE	019	100	2.00		23.	.06	107
	NITRILE+PVC	058	100	.08		23.		107
	PE	076	100	> 6.00		23.		107
			127	> .50	< .10	23.		104
	PVC	007	100	.67		23.		107
		077	100	2.00		23.		107
				1.50		23.		107
	SARANEX	061	127	> .50	< .10	23.		104
Hydrofluoric Acid, >70%								
076643933	NATURAL RUBBER	017	102	4.00		23.	.05	026
				1.50		23.	.05	026
				4.00		23.	.05	026
				1.50		23.	.05	026
	NEOP+NAT RUBBER	026	102	1.50		23.	.06	026
				1.50		23.	.04	026
				4.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	4.00		23.		026
Hydrogen Peroxide, 30-70%								
077228412	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
			102	> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 8.00		23.	.06	026
				> 8.00		23.	.04	026
				> 8.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 8.00		23.		026
	NEOPRENE	002	100	.12		23.		107
		018	100	.08		23.	.04	107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
077228412	NITRILE	019	100	>	6.00			23.	.06	107
	PVC	007	100	>	6.00			23.		107
Hydrogen Phosphide (Phosphine)										
078035120	NATURAL RUBBER	087	UNK		.50	<	.02	23.	.05	173
	NEOPRENE	031	UNK		.42	<	.02	23.	.05	173
		093	UNK		.17	<	.02	23.	.03	173
	PE	091	UNK		.33	<	.02	23.	.04	173
					.42	<	.02	23.	.04	173
	PVC	054	UNK		1.67	<	.02	23.	.02	173
					.67	<	.02	23.	.02	173
Hydroquinone										
001233190	NITRILE+PVC	058	100	>	6.00			23.		107
	PE	076	100	>	6.00			23.		107
	PVC	077	100	>	6.00			23.		107
				>	6.00			23.		107
Hydroquinone, <30%										
001233191	NATURAL RUBBER	017	100	>	6.00	<	.90	23.	.05	107
	NEOPRENE	002	100	>	6.00	<	.90	23.		107
		018	100	>	6.00	<	.90	23.	.04	107
	NITRILE	019	100	>	6.00	<	.90	23.	.06	107
	PVC	007	100	>	6.00	<	.90	23.		107
Iminobispropylamine										
000561880	BUTYL	014	118	>	8.00			28.	.09	323
	NATURAL RUBBER	001	250		.10		84.17	26.	.02	323
	NEOPRENE	018	100	>	8.00			27.	.05	323
	VITON	009	118	>	8.00			27.	.04	323
b-Ionone										
149010760	BUTYL	014	118	>	9.00			23.	.06	323
	PV ALCOHOL	102	100	>	14.00			23.	.04	323
				>	8.00			23.	.03	323
			118	>	8.00			23.	.03	323
Isoamyl Acetate										
001239220	BUTYL	107	120		.03		1,903.80	25.	.02	222
	HYPALON	108	120		.50		350.70	25.	.05	222
	NATURAL RUBBER	017	100		.09		1,102.20	25.	.03	222
			502		.16		791.58	25.	.05	222
			504		.17		661.32	25.	.05	222
					.32		470.94	25.	.06	222
	NEOP+NAT RUBBER	026	102		.16		761.52	25.	.05	222
	NEOP/NAT RUBBER	008	114		.20		731.46	25.	.05	222
	NEOPRENE	002	100		.20		140.28	25.	.08	222
			120		.09		120.24	25.	.07	222
		018	118	>	1.00			25.	.08	222
			120		.50		310.62	25.	.05	222
					.27		541.08	25.	.03	222
	NITRILE	019	100	>	1.00			25.	.04	222
				>	1.00			25.	.06	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001239220	NITRILE	019	100	1.08	63.13	25.	.04	222
			191	.70	130.26	25.	.03	222
	PE	006	100	.03	20.04	25.	.01	222
			505	> 1.00	< 10.02	25.	.01	222
	PVC	003	120	.02	3,306.60	25.	.01	222
				.02	3,306.60	25.	.01	222
				.08	1,603.20	25.	.03	222
				.06	2,505.00	25.	.02	222
			500	.02		25.	.01	222
			501	.02	4,509.00	25.	.01	222
				.03	2,104.20	25.	.02	222
Isoamylnitrile								
001104630	NEOPRENE	018	100	.78	224.25	23.	.05	000
	NITRILE	019	100	2.93	9.62	23.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	1.13	55.31	23.	.02	323
Isobutyl Acrylate								
001066380	BUTYL	014	118	> 8.00		23.	.09	323
	NITRILE	019	100	1.13	126.25	23.	.05	323
	PV ALCOHOL	102	100	> 8.00		23.	.08	323
	PVC	003	100	.02	204.41	23.	.02	323
Isobutyl Alcohol								
000788310	BUTYL	014	118	> 8.00		23.	.07	323
	NATURAL RUBBER	001	210	2.00	4.51	23.		080
		017	100	.42	9.02 - 90.18	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
			210	6.00	< .02	23.		080
		018	100	.17	< .90	23.	.04	107
				> 8.00		23.	.05	323
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
			118	> 8.00		23.	.05	323
	NITRILE+PVC	057	210	4.00	4.81	23.		080
		058	100	.12	.90 - 9.02	23.		107
	PE	076	100	.05	.90 - 9.02	23.		107
	PVC	007	100	.17	< .90	23.		107
			210	2.00	4.51	23.		080
		077	100	.50	< .90	23.		107
				2.00	.90 - 9.02	23.		107
	VITON	009	118	> 8.00		23.	.05	323
Isobutyl Nitrite								
005425630	BUTYL	014	118	1.30	132.26	23.	.04	323
	NITRILE	019	100	1.63	6.01	23.	.06	323
	PVC	003	100	.03	1,454.90	23.	.02	323
	VITON	009	118	.33	619.24	23.	.04	323
Isobutyraldehyde								
000788420	BUTYL	014	118	> 8.00		23.	.06	323
	NEOPRENE	018	100	.42	48.70	23.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000788420	PV ALCOHOL	102	100	.02	1.57	23.	.04	323
	VITON	009	118	.07	69.14	23.	.03	323
Isooctane								
266356430	NATURAL RUBBER	001	103		294.59	23.		045
	NEOPRENE	002	100	6.00	< .90	23.		107
		018	100	1.00	9.02 - 90.18	23.	.04	107
		125	103		< .02	23.		045
	NITRILE	019	100	6.00	< .90	23.	.06	107
			103		< .02	23.		045
	NITRILE+PVC	058	100	.28	.90 - 9.02	23.		107
	PE	076	100	.23	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	.67	.90 - 9.02	23.		107
	PVC	007	103		3.01	23.		045
		077	100	.25	.90 - 9.02	23.		107
				1.25	.90 - 9.02	23.		107
Isoprene								
000787950	NEOPRENE	018	100	.27	192.38	23.	.05	323
	NITRILE	019	100	.87	27.66	23.	.04	323
	PV ALCOHOL	102	100	> 12.00		23.	.03	323
	VITON	009	118	6.20	1.14	23.	.03	323
Isopropyl Alcohol (Propanol, 2-)								
000676300	CPE	060	113	> 8.00		23.	.05	204
	NATURAL RUBBER	001	210	1.50	12.63	23.		080
		017	100	.12	< .90	23.	.05	107
			102	.25	.12	23.	.05	026
				.17	1.80	23.	.05	026
				.25	.12	23.	.05	026
				.37	1.20	23.	.05	026
	NEOP+NAT RUBBER	026	102	.15	1.20	23.	.06	026
				.23	1.20	23.	.04	026
				.25	.12	23.	.05	026
			121	.52	6.01	23.	.05	237
	NEOP/NAT RUBBER	008	102	.25	.12	23.		026
	NEOPRENE	002	100	> 6.00	< .90	23.		107
			210	2.00	4.81	23.		080
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.58	.90 - 9.02	23.		107
	PE	076	100	.17	.90 - 9.02	23.		107
	PVC	007	100	2.50	< .90	23.		107
			210	2.17	12.02	23.		080
		077	100	.50	.90 - 9.02	23.		107
				.50	.90 - 9.02	23.		107
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Isopropylamine								
000753100	BUTYL	014	118	4.08	36.07	24.	.09	323
	NEOPRENE	018	100	.23	913.82	21.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000753100	PVC	007	100	.03	4,671.32	18.	.02	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	.18	3,342.67	26.	.04	323
Isopropyl Ether								
001082030	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	017	UNK	.06	> 480.96	23.	.04	274
	NEOP/NAT RUBBER	008	UNK	.12	> 501.00	23.	.05	274
	NEOPRENE	018	UNK	> 1.00		23.	.09	274
				.71	> 10.02	23.	.06	274
	NITRILE	019	UNK	> 1.00		23.	.05	274
	PV ALCOHOL	004	UNK	> 1.00		23.	.12	274
	PVC	007	UNK	.25	> 501.00	23.	.16	274
	VITON	009	UNK	> 1.00		23.	.03	274
Isopropylmethacrylate								
046553490	BUTYL	014	118	> 8.00		23.	.09	323
	NITRILE	019	100	1.88	36.07	23.	.05	323
	PV ALCOHOL	102	100	> 8.00		23.	.09	323
	PVC	003	100	.02	354.71	23.	.02	323
Kerosene								
080082060	NATURAL RUBBER	017	100	.50	.90 - 9.02	23.	.05	107
	NEOP+NAT RUBBER	026	121	.60	12.02	23.	.05	237
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	1.25	9.02 - 90.18	23.		107
	PE	076	100	.20	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	100	> 6.00	< .90	23.		107
		077	100	.50	9.02 - 90.18	23.		107
				3.00	9.02 - 90.18	23.		107
Lactic Acid, >70%								
000793343	NATURAL RUBBER	017	100	> 6.00	< .90	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	> 6.00	< .90	23.		107
	PE	076	100	> 6.00	< .90	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	100	> 6.00	< .90	23.		107
		077	100	> 6.00	< .90	23.		107
				> 6.00	< .90	23.		107
Lauric Acid, 30-70%								
001430772	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	PVC	007	100	.25		23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
d-Limonene (Menthadiene)								
059892750	BUTYL	014	118	> 8.00		23.	.02	323
	NEOPRENE	018	100	1.08		23.	.05	323
	NITRILE	019	100	> 20.00		23.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
Maleic Acid, >70%								
001101673	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	100	> 6.00		23.		107
		077	100	> 6.00		23.		107
				> 6.00		23.		107
Mesityl Oxide (Methylpentenone, 4-,3-,2-)								
001417970	CPE	060	UNK	1.83		23.		142
				.33		23.		142
	VITON/CHLOROBUTYL	112	UNK	> 3.00		23.		142
Methacrylonitrile								
001269870	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	< .02	1,803.60	23.	.02	323
	PV ALCOHOL	102	100	.40	.48	23.	.06	323
	PVC	003	100	.03	1,142.28	23.	.02	323
Methanesulfonic Acid								
000757520	NEOPRENE	018	100	> 4.00		23.	.05	123
	PVC	003	215	> 4.00		23.	.05	123
Methanol (Methyl Alcohol)								
000675610	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	060	113	> 3.00		25.	.07	302
	NATURAL RUBBER	001	210	6.00	< .02	23.		080
		017	100	.33	8.02	25.	.03	222
				.22	< .90	23.	.05	107
			102	.25	1.20	23.	.05	026
				.25	1.20	23.	.05	026
				.25	1.20	23.	.05	026
				.25	1.20	23.	.05	026
			120	.03	18.04	25.	.02	222
			502	> 1.00	< 4.01	25.	.05	222
			504	.30	4.01	25.	.05	222
				> 1.00	< 4.01	25.	.06	222
			UNK	> 1.00		23.	.04	274
	NEOP+NAT RUBBER	026	102	.25	1.20	23.	.06	026

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000675610	NEOP+NAT RUBBER	026	102	.25	1.20	23.	.05	026
			121	.30	> 6.01	23.	.05	237
	NEOP/NAT RUBBER	008	102	.25	1.20	23.		026
			114	.40	4.01	25.	.05	222
			UNK	> 1.00		23.	.05	274
	NEOPRENE	002	100	.25	< .90	23.		107
				.29	6.01	25.	.08	222
			120	.38	5.01	25.	.07	222
			210	6.00	< .02	23.		080
		018	100	1.00	< .90	23.	.04	107
			118	> 1.00	< 4.01	25.	.08	222
			120	> 1.00	< 4.01	25.	.05	222
				> 1.00	< 4.01	25.	.07	222
				> 1.00	< 4.01	25.	.05	222
				> 1.00	< 4.01	25.	.03	222
			UNK	> 1.00		23.	.09	274
				> 1.00		23.	.06	274
		031	UNK	1.03		23.	.04	187
		093	117	5.92		23.	.02	213
		138	117	5.00		23.	.03	213
		139	117	> 8.00		23.	.02	213
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	1.15	23.05	25.	.04	222
				.18	90.18 - 901.80	23.	.06	107
				> 1.00	< 4.01	25.	.06	222
				.90	36.07	25.	.04	222
			503	.65	29.06	25.	.03	222
			UNK	> 1.00		23.	.05	274
		033	UNK	.91		23.	.05	187
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.33	.90 - 9.02	23.		107
	PE	006	100	> 1.00	< 4.01	25.	.01	222
			505	> 1.00	< 4.01	25.	.01	222
		076	100	.22	< .90	23.		107
			117	> 8.00		23.	.01	213
	PV ALCOHOL	004	100	.02	124.75	23.		123
				.02	124.75	21.		124
			UNK	.04	> 30.06	23.	.12	274
	PVC	003	120	.03	36.07	25.	.01	222
				.03	34.07	25.	.01	222
				.05	18.04	25.	.03	222
				.05	23.05	25.	.02	222
			500	.03	34.07	25.	.01	222
			501	.02	38.08	25.	.01	222
				.04	30.06	25.	.02	222
		007	100	.75	9.02 - 90.18	23.		107
			210	6.00	< .02	23.		080
			UNK	> 1.00		23.	.16	274
				1.50		23.	.07	186
				.77		23.	.05	186
		049	117	.83		23.	.01	213
			UNK	.68		23.	.03	187
		077	100	.17	< .90	23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000675610	PVC	077	100	.50	9.02 - 90.18	23.		107
			117	< .08		23.	.01	213
	SARANEX	061	117	> 8.00		23.	.01	213
	TEFLON	069	510	> 14.20	< .02	23.	.05	303
				> 5.00	< .02	24.	.05	303
	VITON	009	UNK	> 1.00		23.	.03	274
		145	117	.83		23.	.01	213
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
4-Methoxy-4-methyl-2-pentanone								
001077000	BUTYL	014	118	> 13.00		23.	.07	323
	NEOPRENE	018	100	1.65	33.07	23.	.05	323
	PV ALCOHOL	102	100	> 14.00		23.	.03	323
	VITON	009	118	.40	116.03	23.	.03	323
Methyl Acetate								
000792090	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	< .02	6,012.00	23.	.02	323
	PE	076	100	.07	.90 - 9.02	23.		107
	PV ALCOHOL	102	100	.68	12.02	23.	.07	323
	PVC	003	100	< .02	6,012.00	23.	.02	323
Methyl Acrylate								
000963330	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	.02	625.25	23.	.02	323
	NEOPRENE	018	100	.25	3,168.32	23.	.05	323
	PV ALCOHOL	102	100	1.50	1.80	23.	.07	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Methylamine (Monomethylamine)								
000748950	NATURAL RUBBER	017	100	.42	9.02 - 90.18	23.	.05	107
	NEOPRENE	002	100	6.00	< .90	23.		107
		018	100	4.50	9.02 - 90.18	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	PVC	007	100	2.25	.90 - 9.02	23.		107
Methylamine, 30-70%								
000748952	BUTYL	014	118	> 15.00	< .02	23.	.04	227
	NITRILE	019	118	> 8.00		23.	.04	227
	NITRILE+PVC	058	100	.50	9.02 - 90.18	23.		107
	PE	076	100	.17	9.02 - 90.18	23.		107
	PVC	077	100	.17	< .90	23.		107
				1.00	.90 - 9.02	23.		107
	SILVER SHIELD	122	118	1.90	12.02	23.	.01	227
	VITON	009	118	> 16.00	< .02	23.	.02	227
3-Methylaminopropylamine								
062918450	BUTYL	014	118	> 8.00	< .02	20.	.07	323
	NATURAL RUBBER	001	250	.05	731.46	16.	.02	323
	NEOPRENE	018	100	1.05	160.32	16.	.05	323
	PVC	007	100	.03	671.34	14.	.02	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Methyl Bromide (Bromomethane)								
000748390	SARANEX	061	127	> 8.00		23.		104
Methyl Cellosolve (Methoxyethanol, 2)								
001098640	BUTYL	014	118	> 20.00		23.	.05	123
	NEOP+NAT RUBBER	026	121	.58	6.01	23.	.05	237
	NITRILE	019	100	.67	60.12	23.		123
Methyl Chloroacetate								
000963440	SARANEX	061	127	> 8.00	18.04	23.		104
Methyl Chloroform (Trichloroethane,1,1,1)								
000715560	BUTYL	014	118	.48	918.50	25.	.04	288
			UNK	.48	919.84	23.	.04	100
				1.00		25.	.05	326
		064	UNK	.42		25.	.04	326
	NATURAL RUBBER	001	210	.13	901.80	23.		080
		017	100	.06	2,605.20	25.	.03	222
			120	.03	5,711.40	25.	.02	222
			502	.12	3,106.20	25.	.05	222
			504	.12	1,803.60	25.	.05	222
				.22	1,202.40	25.	.06	222
			UNK	.07		25.	.02	326
	NEOP+NAT RUBBER	026	102	.13	3,006.00	25.	.05	222
	NEOP/NAT RUBBER	008	114	.17	2,404.80	25.	.05	222
	NEOPRENE	002	100	.07	1,002.00	25.	.08	222
			120	.04	701.40	25.	.07	222
			210	.20	781.56	23.		080
		010	100	.40	895.12	25.	.05	288
		018	100	.32	745.49	23.	.05	323
			120	.32	1,002.00	25.	.05	222
				.80	801.60	25.	.07	222
				.42	901.80	25.	.05	222
				.27	1,002.00	25.	.03	222
			UNK	.40	895.79	23.	.05	100
				.75		25.	.06	326
	NITRILE	005	210	2.00	601.20	23.		080
		019	100	.18	4,108.20	25.	.04	222
				2.00	901.80 - 9,018.00	23.	.06	107
				> 1.00	< 10.02	25.	.06	222
				.93	< 50.10	25.	.04	222
			118	.62	459.32	23.	.04	323
				.68	459.32	23.	.04	227
			181	.60		25.	.03	222
			503	.06	2,605.20	25.	.03	222
			UNK	.50		25.	.02	326
				.28	282.56	23.	.03	100
		020	100	.28	282.23	25.	.03	288
	NITRILE+PVC	057	210	.83	96.19	23.		080
		058	100	.15	90.18 - 901.80	23.		107
				.10	901.80 - 9,018.00	23.		107
	PE	006	100	.03	130.26	25.	.01	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000715560	PE	006	100	< .02	154.48	25.	.01	288
			505	.20	30.06	25.	.01	222
			UNK	< .02	154.48	23.	.01	100
		042	UNK	.05		25.	.01	326
		076	100	.13	.90 - 9.02	23.		107
				.02	90.18 - 901.80	23.		107
			UNK	.20		25.	.01	326
	POLYURETHANE	050	UNK	.03		25.	.01	326
	PV ALCOHOL	004	100	1.00	< .90	23.		107
		102	100	> 8.00		23.	.03	323
				> 6.00		25.	.05	288
			UNK	> 8.00		23.	.05	100
	PVC	003	118	.02	1,593.18	25.	.01	288
			500	.01	3,206.40	25.	.01	222
			501	.01	4,008.00	25.	.02	222
			UNK	.02	1,593.18	23.	.01	100
		007	210	.50	120.24	23.		080
		077	100	.10	9.02 - 90.18	23.		107
				.25	9.02 - 90.18	23.		107
				.03	90.18 - 901.80	23.		107
			UNK	.05		25.	.03	326
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 15.17		23.	.03	323
				> 15.00		23.	.02	227
				> 6.00		25.	.02	288
			UNK	> 8.00		23.	.02	100
				> 24.00		25.	.03	326
Methylene Bromide (Dibromomethane)								
000749530	PE	076	100	.03	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
Methylene Chloride (Dichloromethane)								
000750920	BUTYL	014	118	.17	698.06	25.	.04	288
			UNK	.17	696.39	23.	.04	100
	CPE	060	113	.25 - .42		25.	.07	302
	NATURAL RUBBER	001	210	.10	1,803.60	23.		080
			UNK	.03	> 140.28	23.	.12	274
		017	100	.02	8,216.40	25.	.03	222
			120	.01	13,026.00	25.	.02	222
			502	.05	4,308.60	25.	.05	222
			504	.03	4,809.60	25.	.05	222
				.05	3,807.60	25.	.06	222
			UNK	.03	> 120.24	23.	.04	274
	NEOP+NAT RUBBER	026	102	.05	4,609.20	25.	.05	222
			121	.03	1,274.54	23.	.05	237
	NEOP/NAT RUBBER	008	114	.07	3,406.80	25.	.05	222
			UNK	.03	> 160.32	23.	.05	274
	NEOPRENE	002	100	.13	1,102.20	25.	.08	222
			120	.01	2,805.60	25.	.07	222
			210	.08	1,803.60	23.		080
		010	100	< .02	2,688.70	25.	.05	288

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000750920	NEOPRENE	018	118	.22	2,004.00	25.	.08	222
			120	.07	3,507.00	25.	.05	222
				.15	2,605.20	25.	.07	222
				.11	2,805.60	25.	.05	222
				.03	4,809.60	25.	.03	222
			UNK	< .02	2,687.36	23.	.05	100
				.21	> 150.30	23.	.09	274
				.08	> 140.28	23.	.06	274
		125	103	1,881.76 -	.02	23.		045
	NITRILE	005	210	3.00	5,410.80	23.		080
		019	100	.04	12,024.00	25.	.04	222
				.11	8,216.40	25.	.06	222
				.04	13,026.00	25.	.04	222
			103		4,016.02	23.		045
			118	.07	4,605.19	23.	.04	227
			503	.03	1,903.80	25.	.03	222
			UNK	< .02	5,639.26	23.	.03	100
				.04	> 125.25	23.	.05	274
				.03	> 150.30	23.	.05	274
		020	100	< .02	5,644.60	25.	.03	288
	NITRILE+PVC	057	210	.20	2,645.28	23.		080
	PE	006	100	.01	300.60	25.	.01	222
				< .02	420.84	25.	.01	288
			505	.03	100.20	25.	.01	222
			UNK	< .02	420.84	23.	.01	100
		076	100	.02	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	.28	< .90	23.		107
			UNK	> 1.00		23.	.12	274
		102	100	> 8.00		23.	.04	323
				> 6.00		25.	.05	288
			UNK	> 8.00		23.	.05	100
	PVC	003	118	< .02		25.	.01	288
			120	.01		25.	.01	222
				.01	> 16,699.98	25.	.01	222
				.02	12,024.00	25.	.03	222
				.01	> 16,699.98	25.	.02	222
			500	.01	> 16,699.98	25.	.01	222
			501	.01	> 16,699.98	25.	.01	222
				.01	> 16,699.98	25.	.02	222
			UNK	< .02		23.	.01	100
		007	103		2,555.10	23.		045
			210	.10	3,486.96	23.		080
			UNK	.17	> 150.30	23.	.16	274
	SILVER SHIELD	122	118	1.90	.02	23.	.01	227
	TEFLON	069	510	.78	.02	23.	.05	303
				.84	.02	23.	.05	303
				.92	.02	23.	.05	303
				.62		24.	.05	303
				.62		24.	.05	303
				.58		24.	.05	303
				.75		24.	.05	303
	VITON	009	118	1.00	44.00	23.	.02	227
				1.38	23.38	25.	.02	288

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000750920	VITON	009	UNK	1.38	22.85	23.	.02	100
				.95	> 10.02	23.	.03	274
	VITON/CHLOROBUTYL	112	113	.42 - .60		25.	.04	302
				1.03 - 1.12		15.	.04	302
				.30 - .47		25.	.04	302
				.15 - .23		35.	.04	302
n-Methylethanolamine								
001098310	BUTYL	014	118	> 8.00	< .02	19.	.07	323
	CELLULOSE ACETATE	099	118	> 8.00	< .02	20.	.03	323
	NATURAL RUBBER	001	250	.08	150.30	20.	.02	323
	NEOPRENE	018	100	> 8.00	< .02	20.	.06	323
Methyl Ethyl Ketone (Butanone,2)								
000789330	BUTYL	014	118	> 8.00	< .02	23.	.06	323
			216	> 4.00		23.	.07	123
				> 4.00		21.		124
		064	117	1.67		23.	.02	213
				2.33		23.	.01	213
				2.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	.08		23.	.02	213
	CPE	060	113	.47 - .58		25.	.07	302
	NATURAL RUBBER	001	103		925.85	23.		045
					517.03	23.		045
			210	.10	1,022.04	23.		080
			250	.02	100.20	23.	.01	323
		017	100	.04	601.20	25.	.03	222
				.17	901.80 - 9,018.00	23.	.05	107
			120	.02	801.60	25.	.02	222
			502	.12	320.64	25.	.05	222
			504	.13	400.80	25.	.05	222
				.27	200.40	25.	.06	222
	NEOP+NAT RUBBER	026	102	.09	310.62	25.	.05	222
			121	.08	1,004.00	23.	.05	237
	NEOP/NAT RUBBER	008	114	.15	230.46	25.	.05	222
	NEOPRENE	002	100	.28	200.40	25.	.08	222
			120	.04	501.00	25.	.07	222
			210	.12	721.44	23.		080
		018	100	.22	3,066.12	23.	.05	323
			118	.65	230.46	25.	.08	222
			120	.13	601.20	25.	.05	222
				.45	330.66	25.	.07	222
				.17	601.20	25.	.05	222
				.07	901.80	25.	.03	222
		093	117	< .08		23.	.02	213
		125	103		.60	23.		045
		138	117	< .08		23.	.03	213
		139	117	< .08		23.	.02	213
	NITRILE	005	210	.33	492.98	23.		080
		019	100	.11	3,106.20	25.	.04	222
				.20	1,903.80	25.	.06	222
				.10	2,204.40	25.	.04	222
			103		1.20	23.		045

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000789330	NITRILE	019	181	.06	2,805.60	25.	.03	222
			503	.16	1,503.00	25.	.03	222
	NITRILE+PVC	057	210	.15	607.21	23.		080
	PE	006	100	> .02	10.02	25.	.01	222
			505	.16	< 3.01	25.	.01	222
		076	100	.05	9.02 - 90.18	23.		107
			117	.03		23.	.01	213
	PV ALCOHOL	004	100	.50	9.02 - 90.18	23.		107
		102	100	5.37	.15	23.	.07	323
	PVC	007	103		4.81	23.		045
			210	.27	721.44	23.		080
		049	117	.08		23.	.01	213
	SARANEX	061	117	.15		23.	.01	213
			127	.48	7.82	23.		104
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	145	117	< .16		23.	.01	213
	VITON/CHLOROBUTYL	112	113	.42 - .66		25.	.04	302
	VITON/NEOPRENE	111	117	.07		23.	.02	213
Methyl Ethyl Ketone Peroxide								
013382340	BUTYL	014	118	> 4.00		23.	.07	323
	NATURAL RUBBER	001	250	.75	6.01	23.	.02	323
	NEOPRENE	018	100	> 4.00		23.	.05	323
	VITON	009	118	> 4.00		23.	.04	323
Methylhydrazine								
000603440	BUTYL	014	118	> 2.00		22.	.23	321
				> 2.00		22.	.04	321
		064	113	.01		22.	.03	321
		085	211	> 2.00		22.	.11	321
	CHLOROBUTYL	052	205	> 2.00		23.	.04	321
	CPE	060	113	.87		22.	.05	321
		070	113	1.10		22.	.05	321
	CR 39	095	122	> 2.00		22.	.17	321
	PVC	003	103	.52		22.	.13	321
				1.90		22.	.13	321
		053	126	> 2.00		22.	.05	321
		083	211	> 2.00		22.	.20	321
	TEFLON	055	210	< .01		22.	.02	321
		062	UNK	< .01		22.	.02	321
		067	UNK	< .01		22.	.02	321
		068	UNK	< .01		22.	.02	321
		069	UNK	< .01		22.	.02	321
	VITON	009	118	1.50		22.	.05	321
Methyl Iodide								
000748840	BUTYL	014	118	.92	492.98	23.	.09	323
	NATURAL RUBBER	017	100	.03	13,026.00	25.	.03	222
			120	.03	> 16,699.98	25.	.02	222
			502	.05	8,116.20	25.	.05	222
			504	.04	9,218.40	25.	.05	222
				.06	6,913.80	25.	.06	222
	NEOP+NAT RUBBER	026	102	.03	8,917.80	25.	.04	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000748840	NEOP/NAT RUBBER	008	114	.09	5,310.60	25.	.05	222
	NEOPRENE	002	100	.25	1,402.80	25.	.08	222
			120	.01	4,609.20	25.	.07	222
		018	100	.10	7,893.76	23.	.05	323
			118	.28	2,905.80	25.	.08	222
			120	.07	6,312.60	25.	.05	222
				.20	3,707.40	25.	.07	222
				.07	5,611.20	25.	.05	222
				.04	7,915.80	25.	.03	222
	NITRILE	019	100	.01	6,613.20	25.	.03	222
				.13	8,016.00	25.	.05	222
				.09	6,012.00	25.	.04	222
			181		8,216.40	25.	.03	222
			503	.03	11,022.00	25.	.03	222
	PE	006	100	.01	1,102.20	25.	.01	222
			505	.04	300.60	25.	.01	222
	PV ALCOHOL	102	100	> 8.00		23.	.07	323
	VITON	009	118	6.35	4.21	23.	.04	323
Methyl Isobutyl Ketone (Methylpentanone, 4-,2-)								
001081010	BUTYL	012	UNK	1.50	19.24	25.	.04	273
				2.67	22.24	25.	.04	273
				5.00	52.30	25.	.06	273
				4.50	39.08	25.	.06	273
				1.50	36.07	25.	.04	273
				2.17	40.88	25.	.04	273
				5.00	4.81	25.	.06	273
				5.67	1.20	25.	.06	273
				.17	30.06	25.	.04	273
				.83	70.34	25.	.04	273
				3.00	16.83	25.	.06	273
				3.75	7.82	25.	.06	273
		014	118	4.07	6.01	23.	.05	086
	NATURAL RUBBER	001	210	.25	420.84	23.		080
		017	100	.10	90.18 - 901.80	23.	.05	107
	NEOPRENE	002	210	.25	541.08	23.		080
		010	120	.62	277.22	23.	.06	086
		018	100	.47	529.39	23.	.06	086
			UNK	.33	303.61	25.	.04	273
				.33	284.37	25.	.04	273
				.50	298.80	25.	.06	273
				.53	277.75	25.	.06	273
	NITRILE	005	210	1.67	841.68	23.		080
		019	100	.80	402.47	23.	.06	086
			118	.20	492.65	23.	.04	086
			120	.35	848.36	23.	.05	086
			UNK	.50	304.81	25.	.04	273
				.50	290.38	25.	.04	273
				1.17	290.38	25.	.06	273
				1.17	256.71	25.	.06	273
		020	503	.32	1,033.73	23.	.04	086
	NITRILE+PVC	057	210	.30	781.56	23.		080
	PE	006	512	.01	60.12	23.	.01	086

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001081010	PE	076	100	.03	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	210	.50	991.98	23.		080
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	.20	1,743.48	23.	.04	086
Methyl Isocyanate								
006248390	BUTYL	014	118	.72		13.	.06	323
				1,012.00	90.18	23.	.07	323
	NATURAL RUBBER	001	250	.01		20.	.02	323
				.02	10,641.24	23.	.01	323
	NEOPRENE	018	100	.01		20.	.05	323
				.02	2,254.50	23.	.04	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.03	323
				> 8.00	< .02	23.	.05	323
	VITON	009	118	.02		21.	.03	323
				.07	1,212.42	23.	.03	323
Methyl Methacrylate								
000806260	BUTYL	014	118	4.98	24.05	23.	.09	323
	NATURAL RUBBER	001	250	< .02	9,619.20	23.	.02	323
	PE	076	100	.03	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 8.00		23.	.06	323
	PVC	003	100	< .02	9,619.20	23.	.02	323
	TEFLON	069	510	> 3.10	< .02	23.	.05	303
Methyl-vinyl-ketone								
000789440	CPE	060	UNK	.50		23.		142
				1.67		23.		142
	VITON/CHLOROBUTYL	112	UNK	> 3.00		23.		142
Mineral Spirits								
080524130	NEOP+NAT RUBBER	026	121	.22	138.28	23.	.05	237
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	1.50	.90 - 9.02	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	.10	9.02 - 90.18	23.		107
	PE	076	100	.10	9.02 - 90.18	23.		107
			127	< .08	7.01	23.		104
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	100	2.50	.90 - 9.02	23.		107
		077	100	.10	.90 - 9.02	23.		107
				.10	9.02 - 90.18	23.		107
	SARANEX	061	127	> .17	< .20	23.		104
Monoisopropanolamine								
000789660	BUTYL	014	118	> 8.00		25.	.07	323
	NEOPRENE	018	100	> 8.00		24.	.05	323
	PVC	007	100	> 8.00		25.	.02	323
	VITON	009	118	> 8.00		25.	.04	323
Morpholine								

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001109180	BUTYL	014	118	> 16.00		23.	.04	323
				> 16.00		23.	.04	227
	NATURAL RUBBER	017	100	.50	.90 - 9.02	23.	.05	107
	NITRILE	019	118	.73	1,240.28	23.	.03	323
				.80	1,238.47	23.	.04	227
	PV ALCOHOL	004	100	3.00	< .90	23.		107
		102	100	6.17	25.25	23.	.03	323
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	1.80	581.36	23.	.02	323
				1.90	583.16	23.	.02	227
N-Methyl-2-pyrrolidone								
008725040	NATURAL RUBBER	001	103		3.61	23.		045
	NEOPRENE	125	103		6.01	23.		045
	NITRILE	019	103		24.05	23.		045
	PVC	007	103		24.05	23.		045
Naphtha, V.M.& P (Ligroine)								
080323240	CPE	070	UNK	> 3.00		23.	.05	004
	NEOP+NAT RUBBER	026	121	.07	96.19	23.	.05	237
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	.25	90.18 - 901.80	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	.15	9.02 - 90.18	23.		107
	PE	076	100	.05	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	> 7.00	< .90	23.		107
	PVC	007	100	2.00	< .90	23.		107
		077	100	.08	.90 - 9.02	23.		107
				.33	9.02 - 90.18	23.		107
Nitric Acid								
076973720	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	001	210	2.00		23.		080
	NEOP+NAT RUBBER	026	121	> 8.00	< .02	23.	.05	237
	NEOPRENE	002	210	2.00		23.		080
		093	117	2.67		23.	.01	213
		138	117	1.33		23.	.03	213
		139	117	3.08		23.	.02	213
	NEOPRENE+PVC	127	117	1.08		23.	.02	213
	NITRILE	005	210	4.00		23.		080
	NITRILE+PVC	057	210	4.50		23.		080
		058	117	.42		23.	.01	213
	PE	076	117	8.00		23.	.01	213
	PVC	007	210	3.75		23.		080
		049	117	3.00		23.	.01	213
				.42		23.	.01	213
		053	117	< .33		23.	.02	213
		077	117	< .08		23.	.01	213
				.75		23.	.01	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
076973720	PVC	144	117	.58		23.	.02	213
	SARANEX	061	117	5.00		23.	.01	213
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	145	117	> 8.00		23.	.01	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Nitric Acid, <30%								
076973721	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
			102	> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
				> 8.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 8.00		23.	.06	026
				> 8.00		23.	.04	026
				> 8.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 8.00		23.		026
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	.75		23.		107
	PVC	007	100	> 6.00		23.		107
		077	100	> 6.00		23.		107
				4.75		23.		107
Nitric Acid, 30-70%								
076973722	NATURAL RUBBER	017	102	> 6.00		23.	.05	026
				3.00		23.	.05	026
				5.50		23.	.05	026
				> 8.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 3.00		23.	.06	026
				2.00		23.	.04	026
				> 6.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 6.00		23.		026
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	2.33		23.	.04	107
	PE	076	127	.83		23.		104
	PVC	007	100	5.75		23.		107
	SARANEX	061	127	46.67	< .02	23.		104
Nitric Acid, >70%								
076973723	NATURAL RUBBER	001	UNK	> 1.00		23.		052
		015	UNK	> 1.00		23.	.04	052
	NEOP/NAT RUBBER	008	UNK	> 1.00		23.		052
	NEOPRENE	018	UNK	> 1.00		23.	.09	052
				> 1.00		23.	.06	052
	NITRILE	019	UNK	> 1.00		23.	.05	052
	NITRILE+PVC	058	100	.10		23.		107
	PE	076	100	.22		23.		107
	PVC	003	UNK	.10		23.	.02	052
		007	UNK	> 1.00		23.		052
	SARANEX	061	127	1.78		23.		104
	VITON	009	UNK	> 1.00		23.	.03	052

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Nitric Acid, Fuming Red								
080075870	BUTYL	014	118	> 1.50		23.	.03	001
				> 1.50		23.	.04	001
				> 1.50		23.	.08	001
	CHLOROBUTYL	052	205	> 1.50		23.	.05	001
	CPE	060	113	.45		23.	.05	001
	NATURAL RUBBER	017	100	> 1.50		23.	.04	001
				> 1.50		23.	.05	001
				> 1.50		23.	.04	001
			101	> 1.50		23.	.05	001
			110	> 1.50		23.	.05	001
	NEOP/NAT RUBBER	008	114	> 1.50		23.	.04	001
				> 1.50		23.	.04	001
				> 1.50		23.	.04	001
	NEOPRENE	002	100	> 1.50		23.	.13	001
				> 1.50		23.	.13	001
		018	100	> 1.50		23.	.05	001
	NITRILE	019	100	> 1.50		23.	.04	001
				> 1.50		23.	.04	001
				> 1.50		23.	.03	001
			118	> 1.50		23.	.03	001
	PV ALCOHOL	004	100	< .01		23.	.09	001
	PVC	003	120	.20		23.	.05	001
				.57		23.	.10	001
				.07		23.	.03	001
		007	100	.92		23.	.09	001
				.67		23.	.11	001
				.43		23.	.10	001
		053	189	.37		23.	.07	001
				.07		23.	.06	001
				.25		23.	.07	001
		054	189	.04		23.	.05	001
				.01		23.	.05	001
		077	212	.12		23.	.03	001
	SILVER SHIELD	122	118	.58		23.	.01	227
	VITON	009	118	> 1.50		23.	.03	001
Nitrobenzene								
000989530	BUTYL	014	118	> 23.00		23.	.06	323
				> 23.00		23.	4.00	227
		064	117	> 8.00		23.	.01	213
	CPE	060	113	1.03		25.	.07	302
		070	UNK	1.03		23.	.05	004
	NATURAL RUBBER	017	100	.08	9.02 - 90.18	23.	.05	107
	NEOPRENE	018	100	.75	1.14	23.	.05	323
		031	511	- .67	- 132.26	23.		323
	NITRILE	019	118	.48	10.22	23.	.04	323
				.55	10.22	23.	.04	227
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000989530	TEFLON	069	510	> 3.00	< .02	24.	.05	303
	VITON	009	118	> 8.00		23.	.03	323
				> 8.00		23.	.02	227
	VITON/CHLOROBUTYL	112	113	2.83 - 3.00		25.	.04	302
Nitroethane								
000792430	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	.03	186.37	23.	.02	323
	NEOPRENE	018	100	.82	102.20	23.	.04	323
	PV ALCOHOL	102	100	3.52	2.40	23.	.07	323
Nitrogen Tetroxide								
105447260	BUTYL	014	118	> 2.00		22.	.23	321
				.68		22.	.05	321
		064	113	.60		22.	.03	321
		085	211	> 2.00		22.	.11	321
	CHLOROBUTYL	052	205	> 2.00		23.	.04	321
	CPE	060	113	1.15		22.	.05	321
		070	113	1.25		22.	.06	321
	CR 39	095	122	> 2.00		22.	.17	321
	PE	091	UNK	1.17		22.	.04	321
	PVC	003	103	.33		22.	.13	321
				.20		22.	.13	321
		053	126	.65		22.	.05	321
		083	211	> 2.00		22.	.19	321
	TEFLON	062	UNK	< .01		23.	.02	321
		067	UNK	< .01		23.	.02	321
		069	UNK	< .01		23.	.02	321
				< .01		23.	.02	321
	VITON	009	118	.77		22.	.03	321
Nitromethane								
000755250	BUTYL	014	118	> 8.00		23.	.09	323
	NATURAL RUBBER	001	250	< .02	96.19	23.	.02	323
		017	100	.07	< .90	23.	.05	107
	NEOPRENE	002	100	1.50	< .90	23.		107
		018	100	1.00	.90 - 9.02	23.	.04	107
				1.07	3.01	23.	.05	323
	NITRILE	019	100	.50	90.18 - 901.80	23.	.06	107
	PE	076	100	> 6.00	< .90	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	.17	30.06	23.	.07	323
Nitropropane								
253220140	BUTYL	014	118	> 8.00	< .02	23.	.04	227
		034	UNK	> 101.00		22.	.08	078
	NITRILE	019	118	.27	177.35	23.	.04	227
		033	UNK	.42 - .83	200.40	22.	.09	078
	NITRILE+PVC	058	100	< .08	9.02 - 90.18	23.		107
	PE	076	100	.05	9.02 - 90.18	23.		107
	PV ALCOHOL	035	UNK	< .08	44.09	22.	.02	078
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	VITON	009	118	.35	73.41	23.	2.00	227

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
1-Nitropropane								
001080320	BUTYL	014	118	> 8.00		23.	.04	323
	NITRILE	019	118	.20	177.35	23.	.04	323
	PV ALCOHOL	102	100	> 15.00		23.	.03	323
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	.28	156.91	23.	.03	323
2-Nitropropane								
000794690	BUTYL	014	118	> 8.00		23.	.08	323
	NATURAL RUBBER	001	250	.03	192.38	23.	.02	323
	NEOPRENE	018	100	.72	144.29	23.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.06	323
n-Nitrosodimethylamine								
000551850	CPE	060	113	.50		23.	.05	204
				.70	438.88	23.	.05	204
Nonylphenol								
251545230	NEOPRENE	018	100	> 20.00		23.	.05	123
	NITRILE	019	100	> 4.00		23.	.04	123
n-Octane								
001116590	NATURAL RUBBER	001	210	.33	120.24	23.		080
	NEOPRENE	002	210	7.00	216.43	23.		080
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	4.75	72.14	23.		080
	PVC	007	210	.92	108.22	23.		080
n-Octanol								
290632830	NATURAL RUBBER	001	210	.75	10.22	23.		080
		017	100	1.00	< .90	23.	.05	107
	NEOPRENE	002	100	> 7.00	< .90	23.		107
			210	6.00	< .02	23.		080
		018	100	7.00	< .90	23.	.04	107
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	057	210	6.00	< .02	23.		080
	PV ALCOHOL	004	100	4.00	< .90	23.		107
	PVC	007	100	> 6.00	< .90	23.		107
			210	6.00	< .02	23.		080
Oleic Acid								
001128010	NATURAL RUBBER	017	100	.50	.90 - 9.02	23.	.05	107
	NEOPRENE	002	100	2.50	< .90	23.		107
		018	100	1.00	.90 - 9.02	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	058	100	> 6.00	< .90	23.		107
	PE	076	100	> 6.00	< .90	23.		107
	PV ALCOHOL	004	100	1.00	< .90	23.		107
	PVC	007	100	1.50	.90 - 9.02	23.		107
		077	100	> 6.00	< .90	23.		107
				> 6.00	< .90	23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Oxalic Acid								
001446270	BUTYL	014	118	> 8.00	< .02	19.	.07	323
	NATURAL RUBBER	001	210	6.00	< .02	23.		080
		017	100	> 6.00		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
			210	6.00	< .02	23.		080
		018	100	> 6.00		23.	.04	107
				> 8.00	< .02	19.	.05	323
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00		23.	.06	107
				> 8.00	< .02	19.	.04	323
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	100	> 6.00		23.		107
			210	6.00	< .02	23.		080
		077	100	> 6.00		23.		107
				> 6.00		23.		107
	VITON	009	118	> 8.00	< .02	20.	.03	323
Palmitic Acid								
000571030	NATURAL RUBBER	017	100	.08		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	.50		23.	.06	107
	PVC	007	100	1.25		23.		107
Pentachlorophenol								
000878650	NEOPRENE	002	100	.10	< .90	23.		107
		018	100	.10	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	PV ALCOHOL	004	100	.12	90.18 - 901.80	23.		107
	PVC	007	100	3.00	< .90	23.		107
Pentane								
001096600	NATURAL RUBBER	001	210	.05	913.82	23.		080
		017	100	.03	2,705.40	25.	.03	222
			120	.01	5,711.40	25.	.02	222
			502	.06	1,803.60	25.	.05	222
			504	.06	1,803.60	25.	.05	222
				.09	1,603.20	25.	.06	222
	NEOP+NAT RUBBER	026	102	.07	1,803.60	25.	.05	222
	NEOP/NAT RUBBER	008	114	.03	2,304.60	25.	.05	222
	NEOPRENE	002	100	.75	.90 - 9.02	23.		107
				.11	25.05	25.	.08	222
			120	.11	24.05	25.	.07	222
			210	.50	667.33	23.		080
		018	100	.08	.28	23.	.05	000
				.50	90.18 - 901.80	23.	.04	107
			118	> 1.00	< 2.00	25.	.08	222
			120	1.08	10.02	25.	.05	222
				> 1.00	2.00	25.	.07	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001096600	NEOPRENE	018	120	.63	16.03	25.	.05	222
				.33	21.04	25.	.03	222
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	.03	< .02	23.	.04	323
				> 1.00	< 2.00	25.	.04	222
				> 6.00	< .90	23.	.06	107
				> 1.00	< 2.00	25.	.06	222
				> 1.00	< 2.00	25.	.04	222
			503	.09	10.02	25.	.03	222
	NITRILE+PVC	057	210	1.25	90.18	23.		080
		058	100	.18	9.02 - 90.18	23.		107
	PE	006	100	.01	400.80	25.	.01	222
			505	.05	70.14	25.	.01	222
		076	100	.08	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	.25	< .02	23.	.03	323
	PVC	003	120	.01	1,102.20	25.	.01	222
				.01	811.62	25.	.01	222
				.15	100.20	25.	.03	222
				.04	250.50	25.	.02	222
			500	.01	721.44	25.	.01	222
			501	.01	1,603.20	25.	.01	222
				.02	1,603.20	25.	.02	222
		007	210	.33	210.42	23.		080
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	118	> 8.00		23.	.02	323
				> 8.00		23.	.02	227
Perchloric Acid								
076019030	NATURAL RUBBER	001	210	6.00	< .02	23.		080
	NEOPRENE	002	210	6.00	< .02	23.		080
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	210	6.00	< .02	23.		080
		077	100	> 6.00		23.		107
				> 6.00		23.		107
Perchloric Acid, 30-70%								
076019032	NATURAL RUBBER	017	100	> 6.00		23.	.05	107
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	> 6.00		23.	.04	107
	NITRILE	019	100	> 6.00		23.	.06	107
	PVC	007	100	> 6.00		23.		107
Phenol (Carbolic Acid)								
001089520	CPE	060	113	3.40		23.	.05	204
				2.92	60.12	23.	.05	204
	NATURAL RUBBER	001	210	.58		23.		080
		017	100	> 1.00	< 3.01	25.	.03	222
				1.00	9.02 - 90.18	23.	.05	107
			120	.27	15.03	25.	.02	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001089520	NATURAL RUBBER	017	502	> 1.67	< 3.01	25.	.05	222
			504	> 1.00	< 3.01	25.	.05	222
				> 1.00	< 3.01	25.	.06	222
	NEOP+NAT RUBBER	026	102	> 1.00	< 3.01	25.	.05	222
	NEOP/NAT RUBBER	008	114	> 1.00	< 3.01	25.	.05	222
	NEOPRENE	002	100	> 6.50	< .90	23.		107
				> 1.65	< 3.01	25.	.08	222
			210	.67		23.		080
		018	100	3.00	9.02 - 90.18	23.	.04	107
			118	> 1.00	< 3.01	25.	.08	222
			120	> 1.00	< 3.01	25.	.05	222
				> 1.00	< 3.01	25.	.07	222
				> 1.00	< 3.01	25.	.05	222
				> 1.00	< 3.01	25.	.03	222
	NITRILE	005	210	.67		23.		080
		019	100	.93	300.60	25.	.04	222
				> 1.00	< 3.01	25.	.06	222
				.53	300.60	25.	.04	222
			503	.60	> 250.50	25.	.03	222
	NITRILE+PVC	057	210	2.00		23.		080
	PE	006	100	> 1.00	< 3.01	25.	.01	222
			505	1.00	3.01	25.	.01	222
	PV ALCOHOL	004	100	.50	9.02 - 90.18	23.		107
	PVC	003	120	.05	190.38	25.	.01	222
				.13	120.24	25.	.01	222
				.53	77.15	25.	.03	222
				.25	100.20	25.	.02	222
			500	.10	130.26	25.	.01	222
			501	.10	120.24	25.	.01	222
				.06	120.24	25.	.02	222
		007	100	1.25	.90 - 9.02	23.		107
			210	1.33		23.		080
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Phenol, >70%								
001089523	BUTYL	014	118	> 20.00		23.	.06	323
				> 20.00		23.	.04	227
	NEOPRENE	018	100	> 10.67		23.	.05	000
		125	103		< .02	23.		045
	NITRILE	019	103		18.04	23.		045
			118	.58	1,274.54	23.	.03	323
				.65	> 9,018.00	23.	.04	227
	NITRILE+PVC	058	100	.83	.90 - 9.02	23.		107
	PE	076	100	6.00	< .90	23.		107
	PVC	007	103		18.04	23.		045
		077	100	.50	.90 - 9.02	23.		107
				1.50	.90 - 9.02	23.		107
	VITON	009	118	> 15.00		23.	.03	323
				> 15.00	< .02	23.	.02	227
Phenolphthalein								
000770980	NATURAL RUBBER	017	506	> 8.00		23.	.02	323
	NEOPRENE	018	100	> 8.00		23.	.04	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
000770980	NITRILE	019	100	>	8.00			23.	.04	323
	PVC	003	100	>	8.00			23.	.02	323
Phosphoric Acid										
076643820	NATURAL RUBBER	001	210		6.00	<	.02	23.		080
	NEOPRENE	002	210		6.00	<	.02	23.		080
	NITRILE	005	210		6.00	<	.02	23.		080
	NITRILE+PVC	057	210		6.00	<	.02	23.		080
	PE	076	127	>	14.00			23.		104
	PVC	007	210		6.00	<	.02	23.		080
	SARANEX	061	127	>	14.00			23.		104
Phosphoric Acid, >70%										
076643823	NATURAL RUBBER	017	100	>	6.00			23.	.05	107
			102	>	6.00			23.	.05	026
				>	6.00			23.	.05	026
				>	6.00			23.	.05	026
				>	6.00			23.	.05	026
	NEOP+NAT RUBBER	026	102	>	6.00			23.	.06	026
				>	6.00			23.	.04	026
				>	6.00			23.	.05	026
	NEOP/NAT RUBBER	008	102	>	6.00			23.		026
	NEOPRENE	002	100	>	6.00			23.		107
		018	100	>	6.00			23.	.04	107
	NITRILE	019	100	>	6.00			23.	.06	107
	NITRILE+PVC	058	100	>	6.00			23.		107
	PE	076	100	>	6.00			23.		107
	PVC	007	100	>	6.00			23.		107
		077	100	>	6.00			23.		107
				>	6.00			23.		107
Phosphorus Oxychloride										
100258730	CPE	060	UNK		.83			23.		052
	NEOPRENE	002	UNK	<	.01			23.		052
		018	UNK	>	1.00			23.	.09	052
					.57			23.	.06	052
	NITRILE+PVC	058	UNK		.48			23.		052
	NONWOVEN PE	071	UNK		.08			23.		052
	PV ACETATE	124	UNK		.03			23.		052
	PVC	007	UNK	<	.01			23.		052
	SARANEX	061	UNK		.84			23.		052
	VITON	009	UNK		.26			23.	.03	052
1-Piperazineethanamine										
001403180	BUTYL	014	118	>	4.00			23.	.05	123
Polychlorinated Biphenyls (PCBs) (Aroclor)										
013363630	BUTYL	014	118		24.00			23.	.04	290
				>	24.00			23.	.04	290
	CPE	070	UNK	>	3.00			23.	.05	004
	NATURAL RUBBER	017	UNK		1.00			23.	.02	290
					.08			23.	.02	290
	NEOPRENE	010	UNK	>	24.00			23.	.03	290

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
013363630	NEOPRENE	010	UNK	> 24.00		23.	.03	290
				> 24.00		23.	.03	290
				> 24.00		23.	.03	290
		018	100	> 24.00		23.	.04	290
				> 24.00		23.	.04	290
				24.00		23.	.04	290
				24.00		23.	.04	290
	PE	006	100	1.00		23.	.01	290
				1.00		23.	.01	290
		076	127	< 1.00	< .02	23.		104
	PV ALCOHOL	102	100	> 24.00		23.	.05	290
				> 24.00		23.	.05	290
	SARANEX	061	127	1.00 - 2.00	< .02	23.		104
				6.00		23.	.02	290
				7.00		23.	.02	290
				7.00		23.	.02	290
	TEFLON	036	UNK	> 24.00		23.	.01	290
				> 24.00		23.	.01	290
				> 24.00		23.	.01	290
	VITON	009	118	> 24.00		23.	.02	290
				> 24.00		23.	.02	290
				> 24.00		23.	.02	290
Potassium Hydroxide, 30-70%								
013105832	NATURAL RUBBER	001	210	1.33		23.		080
		017	100	> 6.00		23.	.05	107
	NEOP+NAT RUBBER	026	121	> 8.00	< .02	23.	.05	237
	NEOPRENE	002	100	> 6.00		23.		107
			210	3.00		23.		080
		018	100	> 6.00		23.	.04	107
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00		23.	.06	107
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	007	100	> 6.00		23.		107
			210	6.00	< .02	23.		080
		077	100	> 6.00		23.		107
				> 6.00		23.		107
Promethazinehydrochloride								
000583330	BUTYL	014	118	> 8.00	< .02	19.	.06	323
	NEOPRENE	018	100	> 8.00	< .02	19.	.02	323
	NITRILE	019	100	> 8.00	< .02	22.	.02	323
	PVC	007	100	> 8.00	< .02	20.	.05	323
beta-Propiolactone								
000575780	NATURAL RUBBER	017	508	.25 - .33	4.31	22.	.03	078
	PE	006	209	.17 - .50	1.20	22.	.01	078
	POLYURETHANE	050	178	< .08	831.66	22.	.01	078
Propionaldehyde								
001233860	BUTYL	014	118	> 13.00		23.	.06	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001233860	NEOPRENE	018	100	.20	67.94	23.	.05	323
	PV ALCOHOL	102	100	< .01	27.05	23.	.04	323
	VITON	009	118	< .01	85.37	23.	.03	323
Propionic Acid								
000790940	PE	076	127	.05	1.62	23.		104
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
Propionic Anhydride								
001236260	PE	076	127	.08	76.35	23.		104
Propyl Acetate								
001096040	BUTYL	014	118	2.70	17.20	23.	.04	227
	NATURAL RUBBER	017	100	.08	90.18 - 901.80	23.	.05	107
	NITRILE	019	100	.33	9.02 - 90.18	23.	.06	107
			118	.28	435.87	23.	.04	227
	PE	076	100	.05	.90 - 9.02	23.		107
	PV ALCOHOL	004	100	2.00	.90 - 9.02	23.		107
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
Propyl Alcohol (Propanol)								
000712380	NATURAL RUBBER	001	210	1.17	9.02	23.		080
		017	100	.33	.90 - 9.02	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
			210	1.50	6.01	23.		080
		018	100	2.50	< .90	23.	.04	107
	NITRILE	005	210	6.00	< .02	23.		080
		019	100	> 6.00	< .90	23.	.06	107
	NITRILE+PVC	057	210	6.00	< .02	23.		080
		058	100	.05	.90 - 9.02	23.		107
	PE	076	100	.05	.90 - 9.02	23.		107
	PVC	007	100	1.50	.90 - 9.02	23.		107
			210	2.00	9.02	23.		080
		077	100	.33	.90 - 9.02	23.		107
				.25	.90 - 9.02	23.		107
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
n-Propylamine								
001071080	CPE	070	UNK	.15		23.	.05	004
	TEFLON	069	510	> 10.20	< .02	23.	.05	303
Propylenediamine								
000789000	BUTYL	014	118	> 8.00	< .02	17.	.07	323
	NEOPRENE	018	100	> 8.00	< .02	24.	.05	323
	PVC	007	100	.30	9.02	17.	.02	323
	VITON	009	118	> 8.00	< .02	25.	.02	323
Propylene Dichloride (Dichloropropane 1,2)								
000788750	BUTYL	014	118	2.15	190.38	23.	.08	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.07	323
	PVC	007	100	.03	11,452.86	23.	.02	323
	VITON	009	118	> 8.00	< .02	23.	.03	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
Propylene Glycol								
000575560	NATURAL RUBBER	001	503	> 3.00		23.	.06	086
		017	120	> 3.00		23.	.05	086
	NEOP/NAT RUBBER	008	114	> 3.00		23.	.06	086
	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	006	512	> 3.00		23.	.01	086
		076	100	> 6.00		23.		107
	PVC	077	100	> 6.00		23.		107
				> 6.00		23.		107
Propylene Oxide								
000755690	BUTYL	014	118	2.20	42.08	23.	.06	323
	NATURAL RUBBER	001	506	< .01	1,973.14	23.	.02	323
	PE	076	100	.05	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	.58	9.02 - 90.18	23.		107
		102	100	.07	.90	23.	.03	323
	TEFLON	069	510	2.28	.02	23.	.03	303
				2.83	.02	23.	.05	303
	VITON	009	118	.02	10,769.30	23.	.03	323
1,3-Propylene Oxide								
005033000	BUTYL	014	118	1.13	561.12	23.	.07	323
	NATURAL RUBBER	001	250	< .01	30.06	23.	.02	323
	PV ALCOHOL	004	100	.17	3.01	23.	.03	323
	VITON	009	118	.03	30.06	23.	.03	323
Propylmethacrylate								
022102880	BUTYL	014	118	6.83	48.10	23.	.08	323
	NITRILE	019	100	1.00	150.30	23.	.04	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.07	323
	PVC	003	100	.03	462.92	23.	.02	323
Pyridine								
001108610	NATURAL RUBBER	017	100	.04	701.40	25.	.03	222
			120	.03	1,202.40	25.	.02	222
			502	.13	400.80	25.	.05	222
			504	.20	501.00	25.	.05	222
				.43	300.60	25.	.06	222
	NEOP+NAT RUBBER	026	102	.14	400.80	25.	.05	222
	NEOP/NAT RUBBER	008	114	.23	300.60	25.	.05	222
	NEOPRENE	002	100	.65	200.40	25.	.08	222
			120	.03	701.40	25.	.07	222
		018	118	.85	400.80	25.	.08	222
			120	.33	901.80	25.	.05	222
				.63	601.20	25.	.07	222
				.43	701.40	25.	.05	222
				.07	1,703.40	25.	.03	222
	NITRILE	019	100	.18	3,206.40	25.	.04	222
				.25	3,006.00	25.	.06	222
				.16	3,507.00	25.	.04	222
			181	.09	4,008.00	25.	.03	222
			503	.17	2,404.80	25.	.03	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
001108610	PE	006	100	>	1.00	<	100.20	25.	.01	222
			505	>	1.00	<	10.02	25.	.01	222
Sodium Cyanide, <30%										
001433391	PE	076	127		6.00	<	.02	60.		104
Sodium Cyanide, 30-70%										
001433392	PE	076	127	<	4.00	<	.02	70.		104
Sodium Hydroxide										
013107320	CPE	060	113	>	3.00			25.	.07	302
	NITRILE+PVC	058	100	>	6.00			23.		107
	PE	076	100	>	6.00			23.		107
	PVC	077	100	>	6.00			23.		107
				>	6.00			23.		107
	SILVER SHIELD	122	118	>	6.00			23.	.01	227
	VITON/CHLOROBUTYL	112	113	>	3.00			25.	.04	302
Sodium Hydroxide, <30%										
013107321	NEOP+NAT RUBBER	026	121	>	8.00	<	.02	23.	.05	237
Sodium Hydroxide, 30-70%										
013107322	BUTYL	064	117	>	8.00			23.	.02	213
				>	8.00			23.	.01	213
	BUTYL/NEOPRENE	110	117	>	8.00			23.	.02	213
	NATURAL RUBBER	001	210		6.00	<	.02	23.		080
			UNK	>	1.00			23.		052
		015	UNK	>	1.00			23.	.04	052
		017	100	>	6.00			23.	.05	107
	NEOP/NAT RUBBER	008	UNK	>	1.00			23.		052
	NEOPRENE	002	100	>	6.00			23.		107
			210		6.00	<	.02	23.		080
		018	100	>	6.00			23.	.04	107
			UNK	>	1.00			23.	.09	052
				>	1.00			23.	.06	052
		093	117	>	8.00			23.	.02	213
		138	117	>	8.00			23.	.03	213
		139	117	>	8.00			23.	.01	213
	NEOPRENE+PVC	127	117	>	8.00			23.	.02	213
	NITRILE	005	210		6.00	<	.02	23.		080
		019	100	>	6.00			23.	.06	107
			UNK	>	1.00			23.	.05	052
	NITRILE+PVC	057	210		6.00	<	.02	23.		080
		058	117	>	8.00			23.	.01	213
	NONWOVEN PE	071	127	<	.17		.63	23.		104
	PE	076	117	>	8.00			23.	.01	213
			127	>	8.00	<	.02	23.		104
	PVC	003	UNK	>	1.00			23.	.02	052
		007	100	>	6.00			23.		107
			210		6.00	<	.02	23.		080
			UNK	>	1.00			23.		052
		049	117	>	8.00			23.	.01	213
				>	8.00			23.	.01	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
013107322	PVC	053	117	> 8.00		23.	.02	213
		144	117	> 8.00		23.	.02	213
	SARANEX	061	117	> 8.00		23.	.01	213
			127	> 8.00		23.		104
	TEFLON	069	510	> 71.00	< .02	16.	.05	303
	VITON	009	UNK	> 1.00		23.	.03	052
		145	117	> 8.00		23.	.01	213
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Sodium Hypochlorite, 30-70%								
076815292	NATURAL RUBBER	001	210	6.00	< .02	23.		080
	NEOPRENE	002	210	6.00	< .02	23.		080
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	6.00	< .02	23.		080
	PVC	007	210	6.00	< .02	23.		080
Styrene								
001004c50	CPE	060	113	1.00 - 1.17		25.	.07	302
	NATURAL RUBBER	001	210	.17	348.70	23.		080
	NEOPRENE	002	210	.20	517.03	23.		080
		125	103		30.06	23.		045
	NITRILE	005	210	.50	733.46	23.		080
		019	103		456.91	23.		045
	NITRILE+PVC	057	210	.67	186.37	23.		080
		058	*100*	.07	9.02 - 90.18	23.		107
	PE	076	100	.17	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
	PVC	007	103		156.31	23.		045
			210	.33	216.43	23.		080
	SARANEX	061	127	.72	69.74	23.		104
	TEFLON	069	510	> 4.00	< .02	23.	.05	303
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
Sulfuric Acid								
076649390	BUTYL	064	117	> 8.00		23.	.02	213
				> 8.00		23.	.01	213
				> 8.00		23.	.02	213
	BUTYL/NEOPRENE	110	117	> 8.00		23.	.02	213
	CPE	060	113	> 3.00		25.	.07	302
		070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	001	210	1.33		23.		080
	NEOP+NAT RUBBER	026	121	1.53	462.92	23.	.05	237
	NEOPRENE	002	210	2.50		23.		080
		093	117	1.17		23.	.02	213
		138	117	2.25		23.	.03	213
		139	117	3.67		23.	.02	213
	NEOPRENE+PVC	127	117	1.33		23.	.02	213
	NITRILE	005	210	6.00	< .02	23.		080
	NITRILE+PVC	057	210	4.00		23.		080
		058	117	.42		23.	.01	213
	NONWOVEN PE	071	127	< .08	3,006.00	23.		104
	PE	076	117	> 8.00		23.	.01	213
	PVC	007	210	1.75		23.		080

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
076649390	PVC	049	117	1.33		23.	.01	213
				.42		23.	.01	213
		053	117	.42		23.	.02	213
				< .42		23.	.02	213
		077	117	< .08		23.	.01	213
				.33		23.	.01	213
		144	117	.42		23.	.02	213
	SARANEX	061	117	> 8.00		23.	.01	213
			127	> 8.00		23.		104
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	145	117	> 8.00		23.	.01	213
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
	VITON/NEOPRENE	111	117	> 8.00		23.	.02	213
Sulfuric Acid, <30%								
076649391	NITRILE+PVC	058	100	2.00		23.		107
	NONWOVEN PE	071	127	.50	.92	23.		104
	PE	076	100	> 5.00		23.		107
			127	> 8.00	< .02	23.		104
	PVC	077	100	3.00		23.		107
				2.33		23.		107
	SARANEX	061	127	> 8.00	< .02	23.		104
Sulfuric Acid, 30-70%								
076649392	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	017	102	> 6.00		23.	.05	026
				> 6.00		23.	.05	026
				> 6.00		23.	.05	026
				> 6.00		23.	.05	026
	NEOP+NAT RUBBER	026	102	> 6.00		23.	.06	026
				> 6.00		23.	.04	026
				> 6.00		23.	.05	026
	NEOP/NAT RUBBER	008	102	> 6.00		23.		026
	NONWOVEN PE	071	127	.10	4.51	23.		104
	PE	076	127	> 8.00	< .02	23.		104
	SARANEX	061	127	> 8.00	< .02	23.		104
Sulfuric Acid, >70%								
076649393	NATURAL RUBBER	001	UNK	> 1.00		23.		052
		015	UNK	> 1.00		23.	.04	052
	NEOP/NAT RUBBER	008	UNK	> 1.00		23.		052
	NEOPRENE	002	100	> 6.00		23.		107
		018	100	3.00		23.	.04	107
			UNK	> 1.00		23.	.09	052
				> 1.00		23.	.06	052
	NITRILE	019	UNK	> 1.00		23.	.05	052
	NITRILE+PVC	058	100	.62		23.		107
	NONWOVEN PE	071	127	< .08	38.38	23.		104
	PE	076	100	> 6.00		23.		107
			127	> 8.00	< .02	23.		104
				> 2.00	< .02	65.		104
	PVC	003	UNK	.15		23.	.02	052
		007	100	3.67		23.		107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
076649393	PVC	007	UNK	> 1.00		23.		052
		077	100	.25		23.		107
				1.00		23.		107
	SARANEX	061	127	5.50		65.		104
				> 8.00	< .02	23.		104
	TEFLON	069	510	> 72.00	< .02	25.	.05	303
	VITON	009	UNK	> 1.00		23.	.03	052
Tannic Acid								
014015540	NITRILE+PVC	058	100	> 6.00		23.		107
	PE	076	100	> 6.00		23.		107
	PVC	077	100	> 6.00		23.		107
				> 6.00		23.		107
Tannic Acid, 30-70%								
014015542	NATURAL RUBBER	017	100	> 6.00	< .90	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107
	NITRILE	019	100	> 6.00	< .90	23.	.06	107
	PVC	007	100	> 6.00	< .90	23.		107
1,1,1,2-Tetrachloroethane								
006302060	BUTYL	014	118	2.30	138.28	23.	.07	323
	PV ALCOHOL	102	100	> 8.00		23.	.08	323
	PVC	007	100	.05	330.66	23.	.02	323
	VITON	009	118	> 8.00		23.	.03	323
1,1,2,2-Tetrachloroethane								
000793450	BUTYL	014	118	4.60	70.14	23.	.07	323
	NATURAL RUBBER	017	100	.11	2,605.20	25.	.03	222
			120	.03	5,611.20	25.	.02	222
			502	.09	2,905.80	25.	.05	222
			504	.17	1,402.80	25.	.04	222
				.35	1,302.60	25.	.06	222
	NEOP+NAT RUBBER	026	102	.15	3,206.40	25.	.05	222
	NEOPRENE	002	100	.10	501.00	25.	.08	222
			120	.09	601.20	25.	.07	222
		018	118	> 1.07	< 20.04	25.	.08	222
			120	.53	1,102.20	25.	.05	222
				.83	1,002.00	25.	.07	222
				.30	1,402.80	25.	.05	222
				.16	2,204.40	25.	.03	222
	NITRILE	019	100	.37	3,206.40	25.	.04	222
				1.23	> 300.60	25.	.06	222
				.22	3,106.20	25.	.04	222
			503	.32	2,204.40	25.	.03	222
	PE	006	100	.07	10.02	25.	.01	222
			114	.31	1,402.80	25.	.05	222
			505	> 1.00	< 2.00	25.	.01	222
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.04	323
	PVC	003	120	.02	5,410.80	25.	.01	222
				.02	6,012.00	25.	.01	222
				.10	2,505.00	25.	.03	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000793450	PVC	003	120	.04	4,008.00	25.	.02	222
			500	.01		25.	.01	222
			501	.02	4,108.20	25.	.01	222
				.03	3,106.20	25.	.01	222
		007	100	< .01	70.14	23.	.02	323
	TEFLON	069	510	> 15.20	< .02	23.	.05	303
	VITON	009	118	> 8.00	< .02	23.	.03	323
Tetrachloroethylene (Perchloroethylene)								
001271840	BUTYL	014	118	.17	> 751.50	23.	.04	291
				.17	> 751.50	23.	.04	291
				.13	895.12	25.	.04	288
			UNK	.13	895.79	23.	.04	100
	CPE	070	UNK	1.07		23.	.05	004
	NATURAL RUBBER	001	210	.10	601.20	23.		080
		017	UNK	< .02	> 751.50	23.	.02	291
				< .02	> 751.50	23.	.02	291
	NEOP+NAT RUBBER	026	121	.05	1,478.95	23.	.05	237
	NEOPRENE	002	210	.12	571.14	23.		080
		010	100	.20	980.29	25.	.05	288
		018	100	.10	> 641.28	23.	.04	291
				.13	> 641.28	23.	.04	291
			UNK	.20	979.96	23.	.05	100
	NITRILE	005	210	4.00	6.01	23.		080
		019	100	5.00	.90 - 9.02	23.	.06	107
			118	1.28	33.07	23.	.04	323
				1.30	33.07	23.	.04	227
			UNK	3.52	28.26	23.	.03	100
		020	100	3.52	28.22	25.	.03	288
			191	7.25	47.09	23.	.04	291
				5.33	41.08	23.	.04	291
	NITRILE+PVC	057	210	6.20	90.18	23.		080
		058	100	.08	90.18 - 901.80	23.		107
	PE	006	100	< .02	> 686.37	23.	.01	291
				< .02	> 686.37	23.	.01	291
				< .02	769.87	25.	.01	288
			UNK	< .02	769.54	23.	.01	100
		076	100	.08	90.18 - 901.80	23.		107
	PV ALCOHOL	004	100	5.00	< .90	23.		107
		102	100	> 16.00		23.	.04	323
				.60	2.00	23.	.05	291
				.35	11.62	23.	.05	291
				.80	1.20	23.	.05	291
				> 6.00		25.	.05	288
			UNK	> 8.00		23.	.05	100
	PVC	003	100	< .01	180.96	23.	.02	323
			118	< .02	744.82	25.	.01	288
			UNK	< .02	745.49	23.	.01	100
		007	210	.75	114.23	23.		080
	SARANEX	061	127	.27	1.14	23.		104
				.08	10.02	23.	.02	291
				.03	20.04	23.	.02	291
	SILVER SHIELD	122	118	> 6.00		23.	.01	227

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001271840	TEFLON	036	214	.43	2.30	23.	.01	291
				> 24.00		23.	.01	291
		069	510	> 10.40	< .02	23.	.05	303
				1.80		25.	.05	303
	VITON	009	118	> 17.00		23.	.03	323
				> 17.00		23.	.02	227
				3.17	4.21	45.	.02	291
				3.00	4.21	45.	.02	291
				> 24.00		23.	.02	291
				> 24.00		23.	.02	291
				> 24.00		10.	.02	291
				> 24.00		10.	.02	291
				> 6.00		25.	.02	288
			UNK	> 8.00		23.	.02	100
Tetraethylenepentamine								
001125720	BUTYL	012	118	> 8.00		25.	.09	323
	NATURAL RUBBER	017	506	1.77	12.02	28.	.02	323
	NEOPRENE	018	100	> 8.00		27.	.05	323
	VITON	009	118	> 8.00		23.	.04	323
Tetrafluoroethylene								
001161430	BUTYL	014	118	> 8.00		23.	.06	323
	NEOPRENE	018	100	> 8.00		23.	.06	323
	PV ALCOHOL	102	100	> 8.00		23.	.03	323
	VITON	009	118	> 8.00		23.	.03	323
Tetrahydrofuran								
001099990	BUTYL	014	118	.45	671.54	23.	.07	323
				.52	673.34	23.	.04	227
		064	117	.12		23.	.02	213
				.10		23.	.01	213
				.08		23.	.02	213
	BUTYL/NEOPRENE	110	117	< .08		23.	.02	213
	CPE	060	113	.45 - .05		25.	.07	302
		070	UNK	.20		23.	.05	004
	NATURAL RUBBER	017	100	.04	> 16,699.98	25.	.03	222
			120	.02	> 16,699.98	25.	.02	222
			502	.06	> 16,699.98	25.	.05	222
			504	.04	3,507.00	25.	.05	222
				.11	2,404.80	25.	.06	222
	NEOP+NAT RUBBER	026	102	.06	> 16,699.98	25.	.05	222
	NEOP/NAT RUBBER	008	114	.02	> 16,699.98	25.	.05	222
	NEOPRENE	002	100	.03	8,016.00	25.	.08	222
			120	.02	9,619.20	25.	.07	222
		018	118	.33	9,018.00	25.	.08	222
			120	.09	16,032.00	25.	.05	222
				.23	11,022.00	25.	.07	222
				.08	14,028.00	25.	.05	222
				.05	> 16,699.98	25.	.03	222
		093	117	.03		23.	.02	213
		125	103		829.66	23.		045
		138	117	< .08		23.	.03	213

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001099990	NEOPRENE	139	117	.10		23.	.02	213
	NITRILE	019	100	.10	3,707.40	25.	.04	222
				.10	2,705.40	25.	.06	222
				.08	4,308.60	25.	.04	222
			103		931.86	23.		045
			118	< .01	1,005.81	23.	.04	323
				.07	1,004.00	23.	.04	227
			503	.04	3,507.00	25.	.03	222
	PE	006	100	.01	200.40	25.	.01	222
			505	.05	4.01	25.	.01	222
		076	100	.25	.90 - 9.02	23.		107
			117	.10		23.	.01	213
	PV ALCOHOL	102	100	4.72	2.52	23.	.03	323
	PVC	003	120	.01		25.	.01	222
				.01		25.	.01	222
				.03		25.	.03	222
				.02		25.	.02	222
			500	.01		25.	.01	222
			501	.01		25.	.01	222
		049	117	< .16		23.	.01	213
	SARANEX	061	117	.03		23.	.01	213
	TEFLON	069	510	> 5.50	< .02	25.	.05	303
	VITON	009	118	< .01	1,964.09	23.	.03	323
				.07	1,965.92	23.	.02	227
		145	117	.08		23.	.01	213
	VITON/CHLOROBUTYL	112	113	.15 - .18		25.	.04	302
	VITON/NEOPRENE	111	117	.17		23.	.02	213
N,N,N',N'-Tetramethylenediamine								
001101890	BUTYL	012	118	1.08	48.10	20.	.07	323
		014	118	1.08	48.10	23.	.07	323
	NITRILE	019	100	1.80	90.18	23.	.05	323
				1.80	90.18	24.	.05	323
	PVC	003	100	.03	1,923.84	23.	.02	323
	VITON	009	118	.43	1,725.44	23.	.04	323
				.43	1,725.44	24.	.04	323
Thiophenol (Benzenethiol)								
001089850	BUTYL	014	118	.28	2,024.04	21.	.05	124
	PV ALCOHOL	004	100	> 4.00		21.		124
Toluene								
001088830	BUTYL	012	UNK	.17	273.55	25.	.04	273
				.33	254.31	25.	.04	273
				.50	277.75	25.	.06	273
				.50	276.55	25.	.06	273
				.17	267.53	25.	.04	273
				.25	304.81	25.	.04	273
				.50	281.36	25.	.06	273
				.67	251.30	25.	.06	273
				.17	245.29	25.	.04	273
				.17	253.71	25.	.04	273
				.33	300.60	25.	.06	273

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001088830	BUTYL	012	UNK	.50	281.36	25.	.06	273
		014	118	.35	132.87	23.	.06	323
				.28	1,503.00	22.	.05	122
			216	.15		37.	.06	122
		107	UNK	.18	59.12	25.	.04	149
				.47	69.14	25.	.04	149
				.18	1,503.00	25.	.04	149
				.15	167.33	25.	.04	149
				.70	141.28	25.	.04	149
	CPE	060	113	1.15 - 1.25		25.	.07	302
	NATURAL RUBBER	001	210	.15	637.27	23.		080
			UNK	.01	> 521.04	23.	.12	274
				.28	649.30	25.	.19	088
				.30	913.82	25.	.24	088
		017	100	.03	4,709.40	25.	.03	222
			120	.01	9,218.40	25.	.02	222
			502	.06	2,705.40	25.	.05	222
			504	.05	3,607.20	25.	.05	222
				.07	2,805.60	25.	.06	222
			UNK	.01	> 521.04	23.	.04	274
	NEOP/NAT RUBBER	008	114	.08	4,709.40	25.	.05	222
			UNK	.07	> 541.08	23.	.05	274
	NEOPRENE	002	100	.03	1,002.00	25.	.08	222
			120	.02	2,605.20	25.	.07	222
			210	.15	499.00	23.		080
			UNK	.21		23.	.05	186
		018	100	.20	131.06	23.	.05	323
			118	.53	701.40	25.	.08	222
			120	.23	1,402.80	25.	.05	222
				.43	1,302.60	25.	.07	222
				.28	901.80	25.	.05	222
				.07	2,505.00	25.	.03	222
			509	.52	> 1,503.00	22.	.09	122
			UNK	.46	> 526.05	23.	.09	274
				.21	> 531.06	23.	.06	274
				.08	274.75	25.	.04	273
				.08	240.48	25.	.04	273
				.25	274.75	25.	.06	273
				.33	235.67	25.	.06	273
		031	UNK	.08	3,509.00	25.	.04	149
				.12	767.53	25.	.04	149
				.02	400.80	25.	.04	149
				.37	2,143.28	25.	.04	149
				.12	2,732.45	25.	.04	149
				.31		23.	.04	187
	NITRILE	005	210	1.00	330.66	23.		080
		019	100	.38	300.60	22.	.04	122
				.32	701.40	25.	.04	222
				.17	90.18 - 901.80	23.	.06	107
				.45		37.	.06	122
				.35		37.	.06	122
				1.20	400.80	37.	.06	122
				> 1.00	< 300.60	25.	.06	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001088830	NITRILE	019	100	.24	200.40	34.	.04	122
				.25	300.60	22.	.04	122
				.16		37.	.04	122
				.60	501.00	25.	.04	222
			118	.18	409.42	23.	.04	227
				.25	200.40	22.	.03	122
				.13		37.	.04	122
				.28	200.40	22.	.04	122
			181		400.80	25.	.03	222
			503	.17	801.60	25.	.03	222
			509	.55	300.60	22.	.06	122
			UNK	.36	> 526.05	23.	.05	274
				> 1.00		23.	.05	274
				.33	260.32	25.	.04	273
				.33	201.40	25.	.04	273
				.58	211.62	25.	.06	273
				.67	238.68	25.	.06	273
		020	216	.12	601.20	22.	.03	122
				.10		37.	.04	122
				.11	701.40	34.	.04	122
				.68	501.00	22.	.09	122
			UNK	.13	1,184.36	25.	.03	088
				.13	1,244.48	25.	.03	088
		033	UNK	.23		23.	.05	187
	NITRILE+PVC	057	210	.67	365.73	23.		080
	PE	006	100	.01	2,204.40	25.	.01	222
			505	.03	601.20	25.	.01	222
		056	UNK	.12		23.	.01	187
		076	100	.02	.90 - 9.02	23.		107
			127	< .08	165.33	23.		104
	PV ALCOHOL	004	100	> 25.00		22.	.04	122
				.25	.90 - 9.02	23.		107
			UNK	> 1.00		23.	.12	274
		035	UNK	1.02	11.02	25.	.07	149
				2.30	90.18	25.	.07	149
				.02	4.01	25.	.07	149
				.02	317.63	25.	.07	149
	PVC	003	120	< .01	8,817.60	25.	.01	222
				< .01	5,110.20	25.	.01	222
				.05	2,104.20	25.	.03	222
				.06	1,803.60	25.	.02	222
			215	.20	> 1,503.00	22.	.06	122
			500	< .01	5,310.60	25.	.01	222
			501	< .01	5,911.80	25.	.01	222
				.01	4,809.60	25.	.02	222
		007	129	.20		37.	.05	122
				.13	300.60	22.	.06	122
				.47	200.40	22.	.07	122
				.13	300.60	34.	.05	122
			210	.50	426.85	23.		080
			UNK	.23	> 526.05	23.	.16	274
				.28		23.	.07	186
				.14		23.	.05	186

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
001088830	PVC	007	UNK	.15	829.66	25.	.13	088
				.15	859.72	25.	.13	088
				.09	898.79	25.	.10	088
				.08	829.66	25.	.11	088
		049	UNK	.38		23.	.03	187
	SARANEX	061	127	< .08	20.04	23.		104
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
				> 18.50	< .02	25.	.05	303
	VITON	009	118	> 16.00	< .02	23.	.02	227
				.58		37.	.02	122
				> 3.30		34.	.03	122
				> 4.50		22.	.03	122
				> 7.00		22.	.03	122
			UNK	> 1.00		23.	.03	274
	VITON/CHLOROBUTYL	112	113	> 3.00		25.	.04	302
	VITON/NEOPRENE	022	216	1.67		37.	.06	122
				4.20	200.40	22.	.06	122
Toluene Diisocyanate								
264716250	BUTYL	014	118	> 8.00		23.	.04	323
				> 8.00		23.	.04	227
	CPE	070	UNK	> 3.00		23.	.05	004
	NATURAL RUBBER	017	100	.12	9.02 - 90.18	23.	.05	107
	NITRILE	005	120	> 8.00		23.	.06	236
		019	118	3.86	10.82	23.	.03	323
				3.70	10.82	23.	.04	227
	PE	076	100	1.00	.90 - 9.02	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 16.00		23.	.03	323
	SILVER SHIELD	122	118	> 8.00		23.	.01	227
	TEFLON	069	510	> 3.30	< .02	23.	.05	303
	VITON	009	118	> 16.00		23.	.03	323
				> 16.00		23.	.02	227
p-Toluenesulfonic Acid								
001041540	CPE	070	UNK	> 3.00		23.	.05	004
	NEOPRENE	018	100	> 4.00		23.	.05	123
	PVC	003	215	> 4.00		23.	.05	123
o-Toluidine								
000955340	TEFLON	069	510	> 3.30	< .02	23.	.05	303
Triallylamine								
001027050	NEOPRENE	018	100	1.05	561.12	19.	.05	323
	NITRILE	019	100	> 8.00	< .02	22.	.04	323
	PVC	007	100	.08	621.24	20.	.02	323
	VITON	009	118	> 8.00	< .02	17.	.03	323
Trichloroacetaldehyde (Chloral)								
000758760	BUTYL	014	118	3.32	50.10	23.	.07	323
	PV ALCOHOL	102	100	> 8.00	< .02	23.	.08	323
	PVC	007	100	.07	2,845.68	23.	.02	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000758760	VITON	009	118	7.28	< .02	23.	.03	323
Trichloroacetonitrile								
005450620	BUTYL	014	118	1.98	316.23	23.	.06	323
	NEOPRENE	018	100	1.12	927.65	23.	.06	323
	PV ALCOHOL	102	100	> 8.00		23.	.06	323
	VITON	009	118	1.00	184.57	23.	.03	323
1,2,4-Trichlorobenzene								
001208210	BUTYL	014	UNK	.08		23.	.04	290
				.08		23.	.04	290
	NATURAL RUBBER	017	UNK	.08		23.	.02	290
				.08		23.	.02	290
	NEOPRENE	010	UNK	4.00		23.	.03	290
				5.00		23.	.03	290
		018	UNK	1.00		23.	.04	290
	PE	006	UNK	.17		23.	.01	290
				.17		23.	.01	290
		076	127	< .25	5.01	23.		104
	PV ALCOHOL	102	UNK	1.00		23.	.05	290
				1.00		23.	.05	290
	SARANEX	061	127	.25 - 1.00	.10	23.		104
			UNK	1.00		23.	.02	290
				1.00		23.	.02	290
	TEFLON	036	UNK	1.00		23.	.01	290
				8.00		23.	.01	290
	VITON	009	UNK	.17		23.	.02	290
				.17		23.	.02	290
1,1,2-Trichloroethane								
000790050	BUTYL	014	118	5.78	42.08	23.	.09	323
			UNK	.83		23.	.06	326
		064	UNK	.75		23.	.04	326
	NATURAL RUBBER	017	UNK	.02		23.	.02	326
	NEOPRENE	018	UNK	.12		23.	.06	326
	NITRILE	019	UNK	.03		23.	.02	326
	PE	042	UNK	.06		23.	.01	326
	POLYURETHANE	050	UNK	< .02		23.	.01	326
	PV ALCOHOL	102	100	> 8.00		23.	.07	323
			UNK	.25		23.	.04	326
	PVC	003	118	.03	1,238.47	23.	.02	323
	TEFLON	036	UNK	> 24.00		23.	.01	326
		044	UNK	2.92		23.	.01	326
	VITON	009	118	> 8.00		23.	.05	323
			UNK	> 24.00		23.	.03	326
2,2,2-Trichloroethanol								
001152080	SARANEX	061	127	.32	13.23	23.		104
Trichloroethylene (Trichloroethene)								
000790160	BUTYL	014	118	.23	3,308.40	23.	.06	323
				.08	> 826.65	23.	.04	291
				.08	> 826.65	23.	.04	291

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000790160	BUTYL	014	118	.08	2,037.40	25.	.04	288
				.22	3,306.60	23.	.04	227
			UNK	.08	2,044.08	23.	.04	100
	CPE	070	UNK	.20		23.	.05	004
	NATURAL RUBBER	001	210	.10	1,262.52	23.		080
		017	100	.03	9,418.80	25.	.03	222
			120	.01	> 16,699.98	25.	.02	222
			502	.05	7,615.20	25.	.05	222
			504	.05	6,813.60	25.	.05	222
				.08	5,310.60	25.	.06	222
			UNK	< .02	> 656.31	23.	.02	291
				< .02	> 656.31	23.	.02	291
	NEOP+NAT RUBBER	026	102	.05	7,314.60	25.	.05	222
	NEOP/NAT RUBBER	008	114	.08	5,911.80	25.	.05	222
	NEOPRENE	002	100	.03	1,903.80	25.	.08	222
			120	.03	1,803.60	25.	.07	222
			210	.13	1,160.32	23.		080
			UNK	.23		23.	.05	186
		010	100	.08	2,187.70	25.	.05	288
		018	100	.05	> 566.13	23.	.04	291
				< .07	> 566.13	23.	.04	291
			118	.38	1,302.60	25.	.08	222
			120	.14	2,304.60	25.	.05	222
				.25	2,104.20	25.	.07	222
				.20	1,903.80	25.	.05	222
				.06	4,208.40	25.	.03	222
			UNK	.78	2,194.38	23.	.05	100
		031	UNK	.17 - .25	53.11	22.	.08	078
		125	103		823.64	23.		045
	NITRILE	005	210	.33	1,106.21	23.		080
		019	100	.15	2,004.00	25.	.04	222
				.43	901.80	25.	.06	222
				.16	2,104.20	25.	.04	222
			103		1,791.58	23.		045
			118	.07	1,701.40	23.	.04	323
				.13	1,701.40	23.	.04	227
			503	.13	1,603.20	25.	.03	222
			UNK	.16	1,647.29	23.	.03	100
		020	100	.16	1,646.62	25.	.03	288
			503	< .25	> 826.65	23.	.04	291
				.18	> 826.65	23.	.04	291
		033	UNK	.17 - .25	60.12	22.	.09	078
	NITRILE+PVC	057	210	.50	1,244.48	23.		080
		058	100	.05	901.80 - 9,018.00	23.		107
	PE	006	100	< .02	> 657.31	23.	.01	291
				< .02	> 657.31	23.	.01	291
				.01	1,503.00	25.	.01	222
				< .02	1,394.45	25.	.01	288
			UNK		1,394.78	23.	.01	100
		076	100	.08	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	.50	< .90	23.		107
		035	UNK	< .25	8.02	22.	.01	078
		102	100	> 16.00		23.	.04	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000790160	PV ALCOHOL	102	100	24.00		23.	.05	291
				24.00		23.	.05	291
				24.00		10.	.05	291
				24.00		10.	.05	291
				24.00		45.	.05	291
				24.00		45.	.05	291
				> 6.00		25.	.05	288
			UNK	> 8.00		23.	.05	100
	PVC	003	118	< .02	1,015.36	25.	.01	288
			120	.01	11,022.00	25.	.01	222
				.01	9,018.00	25.	.01	222
				.05	3,807.60	25.	.03	222
				.01	8,216.40	25.	.02	222
			500	.01	13,026.00	25.	.01	222
			501	.01	13,026.00	25.	.01	222
				.01	6,212.40	25.	.02	222
			UNK	< .02	1,016.03	23.	.01	100
		007	103		901.80	23.		045
			210	.33	1,256.51	23.		080
			UNK	.16		23.	.07	186
				.08		23.	.05	186
		077	100	.07	90.18 - 901.80	23.		107
				.05	901.80 - 9,018.00	23.		107
	SARANEX	061	127	< .02	> 310.62	23.	.02	291
				< .02	> 290.58	23.	.02	291
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	TEFLON	036	214	> 24.00		23.	.01	291
				> 24.00		23.	.01	291
		069	510	2.38	.03	23.	.05	303
				2.43	.03	23.	.05	303
				2.60	.03	23.	.05	303
	VITON	009	118	7.35	1.44	23.	.03	323
				> 24.00		10.	.02	291
				> 24.00		10.	.02	291
				.80	23.05	45.	.02	291
				.80	21.04	45.	.02	291
				7.40	1.40	23.	.02	227
				10.00	> 1.60	23.	.02	291
				12.00	> 1.70	23.	.02	291
				> 6.00		25.	.02	288
			UNK	> 8.00		23.	.02	100
1,2,3-Trichloropropane								
000961840	BUTYL	014	118	> 8.00	< .02	23.	.06	323
	NITRILE	019	100	.35	20.04	23.	.04	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.03	323
	VITON	009	118	> 8.00	< .02	23.	.03	323
Tricresyl Phosphate (Tritolyl Phosphate)								
013307850	BUTYL	012	118	> 8.00		23.	.07	323
	NATURAL RUBBER	017	100	.75	< .90	23.	.05	107
	NEOPRENE	002	100	> 6.00	< .90	23.		107
		018	100	> 6.00	< .90	23.	.04	107

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS		PERMEATION RATE UG/CM**2/MIN		TEMP DEG C	THICKNESS CM	REF NUM
013307850	NITRILE	019	100	>	6.00	<	.90	23.	.06	107
	NITRILE+PVC	058	100	>	6.00			23.		107
	PE	076	100	>	6.00			23.		107
	PV ALCOHOL	004	100	>	6.00	<	.90	23.		107
				>	8.00			23.	.08	323
	PVC	003	100	>	8.00			23.	.02	323
		007	100	>	6.00	<	.90	23.		107
		077	100	>	6.00			23.		107
				>	6.00			23.		107
	VITON	009	118	>	8.00			23.	.04	323
Triethanolamine										
001027160	NITRILE+PVC	058	100	>	6.00			23.		107
	PE	076	100	>	6.00			23.		107
	PVC	077	100	>	6.00			23.		107
				>	6.00			23.		107
Triethanolamine, >70%										
001027163	NATURAL RUBBER	017	100		1.00	<	.90	23.	.05	107
	NEOPRENE	002	100	>	6.00	<	.90	23.		107
		018	100	>	6.00	<	.90	23.	.04	107
	NITRILE	019	100	>	6.00	<	.90	23.	.06	107
	PV ALCOHOL	004	100	>	6.00	<	.90	23.		107
	PVC	007	100	>	6.00	<	.90	23.		107
Triethylamine										
001214480	CPE	070	UNK	>	3.00			23.	.05	004
	NEOPRENE	018	100		.62		811.62	20.	.05	323
	NITRILE	019	118	>	8.00	<	.02	19.	.04	323
		020	216	>	4.00			23.	.04	123
	PVC	007	100		.07		290.58	20.	.02	323
	VITON	009	118	>	8.00	<	.02	24.	.03	323
Triethylenetetraamine										
001122430	BUTYL	014	118	>	8.00	<	.02	20.	.06	323
	NEOPRENE	018	100	>	8.00	<	.02	19.	.05	323
	NITRILE	019	100	>	8.00	<	.02	16.	.04	323
	VITON	009	118	>	8.00	<	.02	20.	.03	323
Trifluoroethanol										
000758980	NATURAL RUBBER	017	100	>	1.00	<	4.01	25.	.03	222
			120	>	1.10	<	4.01	25.	.02	222
			502	>	1.33	<	4.01	25.	.05	222
			504	>	1.07	<	4.01	25.	.05	222
				>	1.65	<	4.01	25.	.06	222
	NEOP+NAT RUBBER	026	102	>	1.65	<	4.01	25.	.05	222
	NEOP/NAT RUBBER	008	114	>	1.02	<	4.01	25.	.05	222
	NEOPRENE	002	100	>	1.00	<	4.01	25.	.08	222
			120	>	1.00	<	4.01	25.	.07	222
		018	118	>	1.00	<	4.01	25.	.08	222
			120	>	1.00	<	4.01	25.	.05	222
				>	1.00	<	4.01	25.	.07	222
				>	1.00	<	4.01	25.	.05	222

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000758980	NEOPRENE	018	120	> 1.00	< 4.01	25.	.03	222
	NITRILE	019	100	.33	1,903.80	25.	.04	222
				.97	1,102.20	25.	.06	222
				.28	2,304.60	25.	.04	222
			503	.12	3,106.20	25.	.03	222
	PE	006	100	> 1.00	< 4.01	25.	.01	222
			505	> 1.00	< 4.01	25.	.01	222
		076	127	> 8.00	< .02	23.		104
	PVC	003	120	.08	1,202.40	25.	.01	222
				.12	1,903.80	25.	.01	222
				.25	1,302.60	25.	.03	222
				.11	1,102.20	25.	.02	222
			500	.04	1,002.00	25.	.01	222
			501	.07	300.60	25.	.01	222
				.05	901.80	25.	.02	222
Tri-n-propylamine								
001026920	NEOPRENE	018	100	> 8.00		23.	.05	323
	NITRILE	019	100	> 8.00		23.	.04	323
	PV ALCOHOL	102	100	> 8.00		23.	.06	323
	VITON	009	118	> 8.00		23.	.04	323
Turpentine								
080066420	NEOP+NAT RUBBER	026	121	.07	264.53	23.	.05	237
	NITRILE	019	100	.50	< .90	23.	.06	107
	PV ALCOHOL	004	100	6.00	< .90	23.		107
	TEFLON	069	510	> 3.60	< .02	23.	.05	303
Valeronitrile								
001105980	BUTYL	014	118	> 8.00	< .02	23.	.07	323
	NATURAL RUBBER	017	506	.03	126.25	23.	.02	323
	NEOPRENE	018	100	.68	126.25	23.	.05	323
	PV ALCOHOL	004	100	> 8.00	< .02	23.	.07	323
Vinyl Acetate								
001080540	TEFLON	069	510	1.23	.05	23.	.05	303
				2.28	.05	23.	.05	303
Vinyl Chloride (Chloroethene)								
000750140	CPE	070	UNK	> 3.00		23.	.05	004
	NITRILE	019	103		.02	23.		045
			118	5.70	.84	23.	.04	227
	SILVER SHIELD	122	118	> 6.00		23.	.01	227
	VITON	009	118	4.40	.58	23.	.04	227
4-Vinyl-1-cyclohexene								
001004030	BUTYL	012	113	.52	354.71	23.	.07	323
	NITRILE	019	100	6.53	1.20	23.	.04	323
	PV ALCOHOL	004	100	.90		23.	.09	323
	VITON	009	118	> 8.00		23.	.04	323
Vinylidene Fluoride								
000753870	BUTYL	014	UNK	> 8.00		23.	.07	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
000753870	NATURAL RUBBER	001	250	< .02	6.01	23.	.02	323
	NEOPRENE	018	100	> 5.00		23.	.05	323
				< .02	.37	23.	.05	323
	PVC	003	100	< .02	1.80	23.	.02	323
	VITON	009	118	> 8.00		23.	.04	323
Xylene								
001332070	NATURAL RUBBER	001	210	.12	444.89	23.		080
		017	100	.04	3,406.80	25.	.03	222
			120	.02	5,811.60	25.	.02	222
			502	.08	3,707.40	25.	.05	222
			504	.08	2,805.60	25.	.05	222
				.13	2,404.80	25.	.06	222
	NEOP+NAT RUBBER	026	102	.07	30.06	23.	.06	026
				.07	30.06	23.	.05	026
	NEOP/NAT RUBBER	008	102	.07	30.06	23.		026
			114	.12	2,505.00	25.	.05	222
	NEOPRENE	002	100	.06	501.00	25.	.08	222
			120	.05	601.20	25.	.07	222
			210	.13	408.82	23.		080
		018	118	.73	701.40	25.	.08	222
			120	.23	1,302.60	25.	.05	222
				.30	1,402.80	25.	.07	222
				.38	801.60	25.	.05	222
				.09	3,406.80	25.	.03	222
		031	511	- .27	- 492.98	23.		323
		125	103		30.06	23.		045
	NITRILE	005	210	1.67	300.60	23.		080
		019	100	.80	100.20	25.	.04	222
				1.25	90.18 - 901.80	23.	.06	107
				> 1.00	< 50.10	25.	.06	222
				.95	100.20	25.	.04	222
				.45	168.34	23.	.05	323
			103		84.17	23.		045
			503	.47	300.60	25.	.03	222
	NITRILE+PVC	057	210	.75	330.66	23.		080
		058	100	> .05	9.02 - 90.18	23.		107
	PE	006	505	.07	100.20	25.	.01	222
		076	100	.08	9.02 - 90.18	23.		107
	PV ALCOHOL	004	100	> 6.00	< .90	23.		107
		102	100	> 8.00		23.	.09	323
	PVC	003	100	.02	192.38	23.	.02	323
			120	.03	3,006.00	25.	.01	222
				.02	3,507.00	25.	.01	222
				.08	1,703.40	25.	.02	222
			500	.01	4,509.00	25.	.01	222
			501	.01	3,507.00	25.	.01	222
				.03	2,104.20	25.	.02	222
		007	103		72.14	23.		045
			210	.66	389.11	23.		080
	TEFLON	069	510	> 3.00	< .02	23.	.05	303
	VITON	009	118	> 8.00		23.	.04	323

SUMMARY OF PERFORMANCE DETAIL TESTS
PERMEATION TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	BREAKTHROUGH TIME HOURS	PERMEATION RATE UG/CM**2/MIN	TEMP DEG C	THICKNESS CM	REF NUM
m-Xylene								
001083830	BUTYL	014	118	.65	87.78	23.	.06	323
				.17	228.79	23.	.05	086
	NEOPRENE	018	100	.23	198.55	23.	.06	086
	NITRILE	019	100	1.03	188.78	23.	.04	323
				1.62	72.14	23.	.06	086
			118	.27	396.79	23.	.04	086
			120	.65	198.73	23.	.05	086
		020	503	.55	180.36	23.	.04	086
	PV ALCOHOL	102	100	> 12.67		23.	.03	323
	VITON	009	118	> 16.00		23.	.03	323
				8.00		23.	.04	086
o-Xylene								
000954760	BUTYL	014	118	.87	116.63	23.	.07	323
	CPE	060	113	1.20		23.	.05	204
				1.05	186.37	23.	.05	204
	NITRILE	019	100	.20	179.76	23.	.04	323
	PV ALCOHOL	102	100	> 12.67		23.	.03	323
	VITON	009	118	> 8.00		23.	.03	323
p-Xylene								
001064230	BUTYL	014	118	.45	90.78	23.	.07	323
	NITRILE	019	100	.87	85.97	23.	.04	323
	PV ALCOHOL	102	100	> 14.00		23.	.03	323
	PVC	003	100	< .01	185.17	23.	.02	323
	VITON	009	118	> 16.00		23.	.03	323

APPENDIX B

WEIGHT CHANGE DATA

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
076644171	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Acetic Acid								
000641970	CPE	060	113	27.00	24.00	23.	.05	204
				28.00	24.00	23.	.05	204
				31.00	24.00	23.	.05	204
	NATURAL RUBBER	001	UNK	-1.00	1.00	25.		208
	NEOPRENE	002	UNK	4.00	1.00	25.		208
	NITRILE	005	UNK	-2.00	1.00	25.		208
Acetic Acid, <30%								
000641971	PE	041	UNK	.90	8,760.00	23.		305
		042	UNK	.80	8,760.00	23.		305
		048	UNK	.80	8,760.00	23.		305
Acetic Acid, 30-70%								
000641972	NATURAL RUBBER	001	120	1.00	.50	23.	.05	236
				< .01	.08	23.	.05	236
				1.00	1.00	23.	.05	236
				8.00	4.00	23.	.05	236
	NEOPRENE	010	120	< .01	.08	23.	.06	236
				2.00	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				2.00	4.00	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				3.00	.50	23.	.06	236
				4.00	1.00	23.	.06	236
				10.00	4.00	23.	.06	236
	PVC	003	120	3.00	4.00	23.	.08	236
				1.00	1.00	23.	.08	236
				< .01	.50	23.	.08	236
				1.00	.08	23.	.08	236
Acetic Anhydride								
001082470	BUTYL	014	118	1.00	8.00	23.	.09	323
	CPE	060	113	6.10	24.00	23.	.05	204
				2.70	24.00	23.	.05	204
				8.20	24.00	23.	.05	204
	NATURAL RUBBER	001	250	4.00	8.00	20.	.02	323
	NEOPRENE	018	100	16.00	8.00	20.	.05	323
	PVC	007	100	-12.00	8.00	20.	.02	323
Acetone								
000676410	BUTYL	014	UNK	.90	24.00	22.		201
	CPE	060	113	50.00	.58	23.	.05	204
				58.00	.25	23.	.05	204
				64.00	.25	23.	.05	204
	NATURAL RUBBER	001	120	3.00	.08	23.	.05	236
				4.00	.50	23.	.05	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000676410	NATURAL RUBBER	001	120	4.00	1.00	23.	.05	236
				3.00	4.00	23.	.05	236
			UNK	-2.00	1.00	25.		208
		017	UNK	-2.00	24.00	22.		201
	NEOPRENE	002	UNK	-3.00	1.00	25.		208
		010	120	1.00	.08	23.	.06	236
				7.00	.50	23.	.06	236
				8.00	1.00	23.	.06	236
				4.00	4.00	23.	.06	236
		018	UNK	-1.40	24.00	22.		201
				-.30	24.00	22.		201
				-8.00	24.00	22.		201
				-.70	24.00	22.		201
	NITRILE	005	120	9.00	4.00	23.	.06	236
				55.00	1.00	23.	.06	236
				32.00	.50	23.	.06	236
				17.00	.08	23.	.06	236
			UNK	-3.00	1.00	25.		208
		020	UNK	2.70	24.00	22.		201
	PE	041	UNK	1.00	8,760.00	23.		305
		042	UNK	1.20	8,760.00	23.		305
		048	UNK	1.20	8,760.00	23.		305
	PV ALCOHOL	102	UNK	-15.70	24.00	22.		201
	PVC	003	120	2.00	4.00	23.	.08	236
				29.00	1.00	23.	.08	236
				30.00	.50	23.	.08	236
				14.00	.08	23.	.08	236
			UNK	-16.10	24.00	22.		201
Acetonitrile								
000750580	NEOPRENE	010	120	< .01	.08	23.	.06	236
				1.00	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
Allylamine								
001071190	BUTYL	014	118	15.00	8.00	20.	.06	323
	NATURAL RUBBER	001	250	34.00	8.00	20.	.01	323
	PV ALCOHOL	102	100	14.00	8.00	23.	.07	323
	PVC	007	100	-6.00	8.00	20.	.02	323
Allyl Glycidyl Ether								
001069230	BUTYL	014	UNK	1.00	24.00	22.		201
	NATURAL RUBBER	017	UNK	7.00	24.00	22.		201
	NEOP/NAT RUBBER	008	UNK	9.40	24.00	22.		201
	NEOPRENE	018	UNK	1.40	24.00	22.		201
				12.90	24.00	22.		201
				-.50 - .50	24.00	22.		201
	NITRILE	020	UNK	3.20	24.00	22.		201
	PV ALCOHOL	102	UNK	5.20	24.00	22.		201
	PVC	003	UNK	6.40	24.00	22.		201
Ammonium Hydroxide, <30%								

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
013362161	NATURAL RUBBER	001	120	1.00	4.00	23.	.05	236
				1.00	1.00	23.	.05	236
				< .01	.50	23.	.05	236
				< .01	.08	23.	.05	236
	NEOPRENE	010	120	1.00	.08	23.	.06	236
				< .01	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	NITRILE	005	120	2.00	4.00	23.	.06	236
				2.00	1.00	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
	PVC	003	120	< .01	.08	23.	.08	236
				1.00	.50	23.	.08	236
				1.00	1.00	23.	.08	236
				1.00	4.00	23.	.08	236
Ammonium Hydroxide, 30-70%								
013362162	NATURAL RUBBER	001	UNK	-1.00	1.00	25.		208
	NEOPRENE	002	UNK	< .01	1.00	25.		208
	NITRILE	005	UNK	< .01	1.00	25.		208
Amyl Acetate (Pentyl Acetate)								
006286370	NATURAL RUBBER	001	UNK	-2.00	1.00	25.		208
	NEOPRENE	002	UNK	-4.00	1.00	25.		208
	NITRILE	005	UNK	-1.00	1.00	25.		208
Amyl Alcohol (Pentanol)								
000714100	BUTYL	014	118	.40	8.00	23.	.07	323
	NEOPRENE	018	100	4.00	8.00	23.	.05	323
	NITRILE	019	100	9.00	8.00	23.	.04	323
	VITON	009	118	4.00	8.00	23.	.05	323
Aniline (Benzamine)								
000625330	NATURAL RUBBER	001	120	2.00	.50	23.	.05	236
				3.00	1.00	23.	.05	236
				5.00	4.00	23.	.05	236
				2.00	.08	23.	.05	236
	NEOPRENE	010	120	9.00	4.00	23.	.06	236
				5.00	1.00	23.	.06	236
				4.00	.50	23.	.06	236
				5.00	.08	23.	.06	236
	NITRILE	005	120	38.00	1.00	23.	.06	236
				126.00	4.00	23.	.06	236
				24.00	.50	23.	.06	236
				15.00	.08	23.	.06	236
	PVC	003	120	4.00	.08	23.	.08	236
				12.00	1.00	23.	.08	236
				20.00	4.00	23.	.08	236
				10.00	.50	23.	.08	236
Benzene								
000714320	BUTYL	014	118	117.00	168.00	23.		327

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000714320	BUTYL	034	UNK	60.00	168.00	22.		078
				12.00	3.00	25.		126
		064	UNK	55.50	168.00	23.		327
	EVA	074	100	254.00	168.00	23.		327
	NATURAL RUBBER	017	100	309.00	168.00	23.		327
				310.00	168.00	23.		327
			214	286.00	168.00	23.		327
			508	320.00	168.00	22.		078
			UNK	362.00	168.00	23.		327
				351.00	168.00	23.		327
				346.00	168.00	23.		327
	NEOP/NAT RUBBER	008	114	280.00	168.00	22.		078
	NEOPRENE	018	100	262.00	168.00	23.		327
			120	190.00	168.00	23.		327
			UNK	176.00	168.00	23.		327
		031	UNK	90.00	168.00	22.		078
	NITRILE	019	100	161.00	168.00	23.		327
			120	150.00	168.00	23.		327
			166	165.00	168.00	23.		327
		020	UNK	104.00	168.00	23.		327
				104.00	168.00	23.		327
		033	UNK	110.00	168.00	22.		078
	NONWOVEN PE	071	100	218.00	168.00	23.		327
			UNK	162.00	168.00	23.		327
	PE	006	209	30.00	168.00	22.		078
		042	100	32.70	168.00	23.		327
				113.00	168.00	23.		327
		075	100	257.00	168.00	23.		327
	POLYURETHANE	050	178	60.00	168.00	22.		078
	PV ALCOHOL	004	100	3.00	168.00	22.		078
	PVC	003	100	-15.10	168.00	23.		327
			120	-8.00	168.00	23.		327
				-12.40	168.00	23.		327
				-8.10	168.00	23.		327
			214	-.50	168.00	23.		327
	SARANEX	061	200	93.00	168.00	23.		327
	TEFLON	036	214	4.90	168.00	23.		327
	VITON	009	118	20.00	168.00	23.		327
		032	UNK	4.00	168.00	22.		078
Boric Acid								
100433530	BUTYL	014	118	2.00	8.00	20.	.07	323
	NEOPRENE	018	100	2.00	8.00	19.	.05	323
	NITRILE	019	100	2.00	8.00	21.	.04	323
	VITON	009	118	.20	8.00	20.	.03	323
2-Bromoethanol								
005405120	BUTYL	014	118	.20	8.00	23.	.09	323
	NATURAL RUBBER	001	250	2.00	8.00	23.	.02	323
	PVC	003	100	-.20	8.00	23.	.02	323
	VITON	009	118	.60	8.00	23.	.05	323
Butyl Acetate								

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001238640	PE	041	UNK	3.40	8,760.00	23.		305
		042	UNK	3.40	8,760.00	23.		305
		048	UNK	4.10	8,760.00	23.		305
Butylamine								
001097390	BUTYL	014	118	62.00	8.00	15.	.10	323
	NATURAL RUBBER	001	250	148.00	8.00	20.	.02	323
	NEOPRENE	018	100	166.00	8.00	18.	.05	323
	PVC	007	100	62.00	8.00	18.	.02	323
iso-Butylamine (Methylpropylamine, 2-)								
000788190	BUTYL	014	118	37.00	8.00	28.	.09	323
	NEOPRENE	018	100	50.00	8.00	26.	.05	323
	PV ALCOHOL	102	100	-8.00	8.00	23.	.07	323
	PVC	007	100	13.00	8.00	28.	.02	323
sec-Butylamine								
139528460	BUTYL	014	118	83.00	8.00	21.	.09	323
	NEOPRENE	018	100	122.00	8.00	25.	.05	323
	NITRILE	019	100	108.00	8.00	14.	.04	323
	PVC	007	100	-4.00	8.00	24.	.02	323
tert-Butylamine								
000756490	BUTYL	014	118	23.00	8.00	15.	.09	323
	NEOPRENE	018	100	55.00	8.00	23.	.05	323
	NITRILE	019	100	69.00	8.00	21.	.04	323
	PVC	007	100	-20.00	8.00	20.	.02	323
n-Butyl Chloride (Chlorobutane,1-)								
001096930	NITRILE	019	100	100.00	8.00	23.	.05	323
	PV ALCOHOL	004	100	-5.00	8.00	23.	.80	323
	PVC	003	100	-11.00	8.00	23.	.20	323
	VITON	009	118	6.00	8.00	23.	.05	323
Butyraldehyde								
001237280	BUTYL	034	UNK	7.70	3.00	25.		126
				12.50	20.00	25.		126
Carbon Disulfide (Carbon Bisulfide)								
000751500	BUTYL	034	UNK	74.00	3.00	25.		126
	NITRILE	005	120	7.00	4.00	23.	.06	236
				21.00	1.00	23.	.06	236
				16.00	.50	23.	.06	236
				8.00	.08	23.	.06	236
	PE	041	UNK	12.90	8,760.00	23.		305
		042	UNK	21.40	8,760.00	23.		305
		048	UNK	36.80	8,760.00	23.		305
Carbon Tetrachloride (Tetrachloromethane)								
000562350	CPE	060	113	107.00	1.83	23.	.05	204
				116.00	1.83	23.	.05	204
				106.00	1.83	23.	.05	204
	NEOPRENE	010	120	38.00	1.00	23.	.06	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000562350	NEOPRENE	010	120	28.00	.50	23.	.06	236
				13.00	.08	23.	.06	236
				18.00	4.00	23.	.06	236
	NITRILE	005	120	21.00	4.00	23.	.06	236
				11.00	1.00	23.	.06	236
				5.00	.50	23.	.06	236
				3.00	.08	23.	.06	236
	PE	041	UNK	16.30	8,760.00	23.		305
		042	UNK	22.80	8,760.00	23.		305
		048	UNK	37.90	8,760.00	23.		305
Chlorobenzene								
001089070	BUTYL	014	118	169.00	8.00	23.	.07	323
	PV ALCOHOL	102	100	-4.00	8.00	23.	.08	323
	PVC	007	100	101.00	8.00	23.	.02	323
	VITON	009	118	2.00	8.00	23.	.03	323
Chlorodibromomethane								
001244810	BUTYL	012	118	382.00	8.00	23.	.10	323
	PV ALCOHOL	004	100	-.30	8.00	23.	.07	323
	PVC	003	100	385.00	8.00	23.	.02	323
	VITON	009	118	1.00	8.00	23.	.04	323
Chloroform (Trichloromethane)								
000676630	BUTYL	034	UNK	9.00	3.00	25.		126
	NEOPRENE	010	120	23.00	.08	23.	.06	236
				39.00	.50	23.	.06	236
				110.00	1.00	23.	.06	236
				35.00	4.00	23.	.06	236
	PE	041	UNK	12.00	8,760.00	23.		305
		042	UNK	16.20	8,760.00	23.		305
		048	UNK	25.10	8,760.00	23.		305
3-Chloro-2-methylpropene								
005634730	BUTYL	014	118	142.00	8.00	23.	.06	323
	PV ALCOHOL	004	100	28.00	8.00	23.	.04	323
	PVC	007	100	2.00	8.00	23.	.02	323
	VITON	009	118	7.00	8.00	23.	.03	323
2-Chloro-2-nitropropane								
005947180	BUTYL	012	118	2.00	8.00	23.	.09	323
	NATURAL RUBBER	017	506	94.00	8.00	23.	.02	323
	PV ALCOHOL	004	100	-.80	8.00	23.	.07	323
	VITON	009	118	70.00	8.00	23.	.04	323
Chromic Acid, 30-70%								
111157452	NITRILE	005	120	< .01	.08	23.	.06	236
				4.00	.50	23.	.06	236
				3.00	1.00	23.	.06	236
				4.00	4.00	23.	.06	236
	PVC	003	120	18.00	4.00	23.	.08	236
				1.00	1.00	23.	.08	236
				< .01	.50	23.	.08	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
111157452	PVC	003	120	< .01	.08	23.	.08	236
Citric Acid, <30%								
000779291	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Cyclohexylamine								
001089180	BUTYL	014	118	95.00	8.00	20.	.06	323
	NATURAL RUBBER	001	250	299.00	8.00	20.	.02	323
	NEOPRENE	018	100	294.00	8.00	22.	.05	323
	NITRILE	019	100	247.00	8.00	24.	.04	323
Diallyamine								
001240270	BUTYL	014	118	44.00	8.00	21.	.09	323
	PV ALCOHOL	004	100	-20.00	8.00	23.	.08	323
	PVC	007	100	-26.00	8.00	22.	.02	323
	VITON	009	118	4.00	8.00	19.	.03	323
1,3-Diaminopropane								
001097620	BUTYL	014	118	30.00	8.00	22.	.06	323
	NATURAL RUBBER	001	250	18.00	8.00	25.	.02	323
	NEOPRENE	018	100	22.00	8.00	23.	.05	323
	PVC	007	100	24.00	8.00	21.	.02	323
Di-n-amylamine								
020509220	NEOPRENE	018	100	74.00	8.00	16.	.05	323
	NITRILE	019	100	2.00	8.00	20.	.04	323
	PVC	007	100	-23.00	8.00	13.	.02	323
	VITON	009	118	.20	8.00	16.	.03	323
Dichloroacetyl Chloride								
000793670	BUTYL	014	118	164.00	8.00	23.	.09	323
	PV ALCOHOL	102	100	-8.00	8.00	23.	.07	323
	PVC	003	100	230.00	8.00	23.	.02	323
	VITON	009	118	-9.00	8.00	23.	.03	323
Dichlorobromomethane								
000752740	BUTYL	014	118	347.00	8.00	23.	.07	323
	PVC	007	100	328.00	8.00	23.	.02	323
	VITON	009	118	2.00	8.00	23.	.03	323
	VITON/BUTYL	100	102	-2.00	8.00	23.	.08	323
1,4-Dichloro-2-butene								
001105760	BUTYL	034	UNK	19.00	20.00	25.		126
				17.00	3.00	25.		126
cis-Dichloroethylene								
001565920	BUTYL	014	118	198.00	8.00	23.	.07	323
	PV ALCOHOL	004	100	358.00	8.00	23.	.05	323
	VITON	009	118	9.00	8.00	23.	.03	323
1,2-Dichloroethylene								

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CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
005405900	NITRILE	019	100	265.00	8.00	29.	.04	323
	PV ALCOHOL	004	100	-29.00	8.00	23.	.04	323
	PVC	007	100	.50	8.00	23.	.02	323
	VITON	009	118	9.00	8.00	23.	.03	323
trans-1,2-Dichloroethylene								
001566050	BUTYL	014	118	3.00	8.00	23.	.06	323
	PV ALCOHOL	004	100	-30.00	8.00	23.	.09	323
	PVC	007	100	-7.00	8.00	23.	.02	323
	VITON	009	118	8.00	8.00	23.	.03	323
2,2'-Dichloroethyl Ether								
001114440	BUTYL	034	UNK	11.00	20.00	25.		126
				3.80	3.00	25.		126
	CPE	060	113	129.00	.83	23.	.05	204
				125.00	.83	23.	.05	204
				123.00	.83	23.	.05	204
2,3-Dichloro-1-propene								
000788860	BUTYL	014	118	66.00	8.00	23.	.09	323
	PV ALCOHOL	102	100	2.00	8.00	23.	.09	323
	PVC	007	100	76.00	8.00	23.	.02	323
	VITON	009	118	4.00	8.00	23.	.03	323
1,3-Dichloropropene								
005427560	BUTYL	014	118	65.00	8.00	23.	.07	323
	PV ALCOHOL	102	100	-2.00	8.00	23.	.07	323
	PVC	007	100	199.00	8.00	23.	.02	323
	VITON	009	118	3.00	8.00	23.	.03	323
Diethanolamine								
001114220	BUTYL	014	118	2.00	8.00	24.	.09	323
	NEOPRENE	018	100	5.00	8.00	22.	.05	323
	NITRILE	019	100	14.00	8.00	26.	.04	323
	VITON	009	118	3.00	8.00	27.	.03	323
Diethylamine								
001098970	BUTYL	014	118	88.00	8.00	23.	.09	323
	NITRILE	019	100	55.00	8.00	24.	.04	323
	PVC	007	100	-26.00	8.00	24.	.02	323
	VITON	009	118	83.00	8.00	20.	.03	323
Diethylaminoethanol								
001003780	BUTYL	014	118	2.00	8.00	22.	.07	323
	NITRILE	019	118	12.00	8.00	22.	.04	323
	PV ALCOHOL	102	100	-19.00	8.00	23.	.09	323
	VITON	009	118	5.00	8.00	22.	.03	323
Diethylenetriamine								
001114000	BUTYL	014	118	8.00	8.00	24.	.08	323
	NEOPRENE	018	100	12.00	8.00	22.	.05	323
	PVC	007	100	19.00	8.00	22.	.02	323
	VITON	009	118	8.00	8.00	23.	.03	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
Diisobutylamine								
001109630	NEOPRENE	018	100	57.00	8.00	22.	.05	323
	NITRILE	019	100	-1.00	8.00	20.	.04	323
	PV ALCOHOL	102	100	4.00	8.00	23.	.08	323
	VITON	009	118	-2.00	8.00	22.	.02	323
Diisopropylamine								
001081890	NEOPRENE	018	100	51.00	8.00	12.	.05	323
	NITRILE	019	100	6.00	8.00	10.	.04	323
	PVC	007	100	-23.00	8.00	11.	.02	323
	VITON	009	118	1.00	8.00	12.	.03	323
N,N-Dimethylacetamide								
001271950	NATURAL RUBBER	001	120	18.00	4.00	23.	.05	236
				15.00	1.00	23.	.05	236
				21.00	.50	23.	.05	236
				32.00	.08	23.	.05	236
	NEOPRENE	010	120	36.00	4.00	23.	.06	236
				12.00	1.00	23.	.06	236
				12.00	.50	23.	.06	236
				5.00	.08	23.	.06	236
	NITRILE	005	120	18.00	.08	23.	.06	236
				53.00	.50	23.	.06	236
				21.00	1.00	23.	.06	236
				186.00	4.00	23.	.06	236
Dimethylamine								
001244030	BUTYL	014	118	.80	8.00	22.	.06	323
	NATURAL RUBBER	001	250	10.00	8.00	20.	.02	323
	NEOPRENE	018	100	12.00	8.00	22.	.05	323
	PV ALCOHOL	102	100	-6.00	8.00	23.	.07	323
	PVC	007	100	3.00	8.00	20.	.02	323
Dimethylaminopropylamine								
001095570	BUTYL	014	118	22.00	8.00	16.	.09	323
	NATURAL RUBBER	001	250	114.00	8.00	16.	.02	323
	NEOPRENE	018	100	184.00	8.00	20.	.05	323
	PVC	077	100	126.00	8.00	20.	.02	323
Dimethylbutylamine								
001080980	BUTYL	014	118	67.00	8.00	24.	.06	323
	NITRILE	019	100	76.00	8.00	19.	.04	323
	PV ALCOHOL	102	100	-22.00	8.00	23.	.08	323
	PVC	007	100	-3.00	8.00	21.	.02	323
Dimethylethanolamine								
001080100	BUTYL	014	118	.80	8.00	12.	.09	323
	NATURAL RUBBER	001	250	17.00	8.00	19.	.02	323
	NEOPRENE	018	100	57.00	8.00	21.	.05	323
	NITRILE	019	100	34.00	8.00	9.	.04	323
Dimethylformamide								

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CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000681220	NATURAL RUBBER	001	120	1.00	.08	23.	.05	236
				2.00	.50	23.	.05	236
				4.00	1.00	23.	.05	236
				4.00	4.00	23.	.05	236
	NEOPRENE	010	120	2.00	.08	23.	.06	236
				7.00	.50	23.	.06	236
				9.00	1.00	23.	.06	236
				9.00	4.00	23.	.06	236
1,1-Dimethylhydrazine (Dimethylhydrazine,unsym-)								
000571470	BUTYL	034	UNK	10.00	168.00	22.		078
	NEOPRENE	031	UNK	30.00	168.00	22.		078
	NITRILE	033	UNK	38.00	168.00	22.		078
	PVC	077	168	35.00	168.00	22.		078
Dimethyl Sulfoxide								
000676850	NATURAL RUBBER	001	120	2.00	4.00	23.	.05	236
				2.00	.08	23.	.05	236
				2.00	.50	23.	.05	236
				3.00	1.00	23.	.05	236
	NEOPRENE	010	120	1.00	.08	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				3.00	4.00	23.	.06	236
	NITRILE	005	120	39.00	4.00	23.	.06	236
				19.00	1.00	23.	.06	236
				9.00	.50	23.	.06	236
				4.00	.08	23.	.06	236
	PVC	003	120	14.00	4.00	23.	.08	236
				12.00	1.00	23.	.08	236
				9.00	.50	23.	.08	236
				8.00	.08	23.	.08	236
Dimethylvinylchloride								
005133710	NITRILE	019	100	100.00	8.00	23.	.05	323
	PV ALCOHOL	004	100	-10.00	8.00	23.	.08	323
	PVC	003	100	-23.00	8.00	23.	.02	323
	VITON	009	118	8.00	8.00	23.	.04	323
Dipropylamine								
001428470	BUTYL	034	UNK	61.00	3.00	25.		126
	POLYCARBONATE	098	UNK	-.10	3.00	25.		126
Epichlorohydrin								
001068980	BUTYL	014	118	3.00	24.00	23.	.04	291
				1.00	8.00	23.	.07	323
				1.00	8.00	23.	.07	323
		034	UNK	5.00	168.00	22.		078
	NATURAL RUBBER	001	250	13.00	8.00	23.	.02	323
				13.00	8.00	23.	.02	323
		017	UNK	30.00	24.00	23.	.02	291
	NEOPRENE	018	100	100.00	24.00	23.	.04	291
		031	UNK	44.00	168.00	22.		078

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CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001068980	NITRILE	020	503	340.00	24.00	23.	.04	291
		033	UNK	28.00	168.00	22.		078
	PE	006	100	< .01	24.00	23.	.01	291
			209	12.00	168.00	22.		078
	POLYURETHANE	050	178	270.00	168.00	22.		078
	PV ALCOHOL	035	UNK	< 1.00	168.00	22.		078
		102	100	-7.00	24.00	23.	.05	291
				-3.00	8.00	23.	.07	323
				-3.00	8.00	23.	.07	323
	PVC	077	168	103.00	168.00	22.		078
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	20.00	24.00	23.	.02	291
				16.00	8.00	23.	.03	323
				16.00	8.00	23.	.03	323
		032	UNK	42.00	168.00	22.		078
1,2-Epoxybutane								
001068870	BUTYL	014	118	50.00	8.00	23.	.06	323
	NEOPRENE	018	100	150.00	8.00	23.	.05	323
	PV ALCOHOL	004	100	-3.00	8.00	23.	.04	323
	VITON	009	118	94.00	8.00	23.	.03	323
Ethanol, 30-70%								
000641752	PE	041	UNK	.10	8,760.00	23.		305
		042	UNK	.10	8,760.00	23.		305
		048	UNK	.10	8,760.00	23.		305
Ethanol, >70%								
000641753	PE	041	UNK	.20	8,760.00	23.		305
		042	UNK	.20	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Ethanolamine (Aminoethanol,2)								
001414350	BUTYL	014	118	2.00	8.00	26.	.07	323
	NEOPRENE	018	100	7.00	8.00	20.	.05	323
	PVC	007	100	12.00	8.00	25.	.02	323
	VITON	009	118	6.00	8.00	22.	.05	323
2-Ethoxyethyl Acetate (Cellosolve Acetate)								
001111590	NATURAL RUBBER	001	120	12.00	4.00	23.	.05	236
				11.00	1.00	23.	.05	236
				6.00	.50	23.	.05	236
				5.00	.08	23.	.05	236
	NEOPRENE	010	120	17.00	4.00	23.	.06	236
				12.00	1.00	23.	.06	236
				4.00	.50	23.	.06	236
				3.00	.08	23.	.06	236
	NITRILE	005	120	10.00	.08	23.	.06	236
				16.00	.50	23.	.06	236
				23.00	1.00	23.	.06	236
				36.00	4.00	23.	.06	236
Ethyl Acetate								

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001417860	NEOPRENE	010	120	11.00	4.00	23.	.06	236
				16.00	1.00	23.	.06	236
				13.00	.50	23.	.06	236
				3.00	.08	23.	.06	236
	PE	041	UNK	2.50	8,760.00	23.		305
		042	UNK	2.50	8,760.00	23.		305
		048	UNK	2.80	8,760.00	23.		305
Ethyl Cellosolve (Ethoxyethanol, 2)								
001108050	BUTYL	014	118	.70	8.00	23.	.08	323
	NATURAL RUBBER	001	250	17.00	8.00	23.	.02	323
	PV ALCOHOL	102	100	-19.00	8.00	23.	.08	323
	PVC	007	100	17.00	8.00	23.	.02	323
Ethyl Acrylate								
001408850		250	250	67.00	8.00	23.	.02	323
	BUTYL	014	118	13.00	8.00	23.	.09	323
	PV ALCOHOL	102	100	-9.00	8.00	23.	.08	323
	PVC	003	100	74.00	8.00	23.	.02	323
Ethyl Alcohol (Ethanol)								
000641750	NATURAL RUBBER	001	120	1.00	.08	23.	.05	236
				< .01	.50	23.	.05	236
				1.00	1.00	23.	.05	236
				1.00	4.00	23.	.05	236
	NEOPRENE	010	120	1.00	4.00	23.	.06	236
				< .01	1.00	23.	.06	236
				< .01	.50	23.	.06	236
				< .01	.08	23.	.06	236
	NITRILE	005	120	2.00	.08	23.	.06	236
				4.00	4.00	23.	.06	236
				8.00	1.00	23.	.06	236
				3.00	.50	23.	.06	236
	PVC	003	120	1.00	.08	23.	.08	236
				< .01	.50	23.	.08	236
				1.00	1.00	23.	.08	236
				1.00	4.00	23.	.08	236
Ethyl Benzene								
001004140	PV ALCOHOL	102	100	.40	8.00	23.	.08	323
Ethyl Bromide								
000749640	NEOPRENE	018	100	231.00	8.00	23.	.04	323
	PV ALCOHOL	102	100	-14.00	8.00	23.	.08	323
	PVC	003	100	132.00	8.00	23.	.02	323
	VITON	009	118	13.00	8.00	23.	.04	323
Ethyl-n-butylamine								
133606390	NITRILE	019	100	36.00	8.00	24.	.04	323
	PV ALCOHOL	102	100	-24.00	8.00	23.	.09	323
	PVC	007	100	-31.00	8.00	24.	.02	323
	VITON	009	118	17.00	8.00	23.	.03	323

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Ethylene Chlorohydrin (Chloroethanol)								
001070730	BUTYL	014	118	.10	8.00	23.	.06	323
	NEOPRENE	018	100	6.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-7.00	8.00	23.	.09	323
	VITON	009	118	.60	8.00	23.	.05	323
Ethylenediamine (Diaminoethane,1,2)								
001071530	BUTYL	014	118	2.00	8.00	18.	.07	323
	CPE	060	113	-5.00	24.00	23.	.05	204
				13.00	24.00	23.	.05	204
				-6.40	24.00	23.	.05	204
	NATURAL RUBBER	001	250	9.00	8.00	20.	.01	323
	NEOPRENE	018	100	9.00	8.00	18.	.05	323
	PVC	007	100	.80	8.00	16.	.02	323
Ethylene Dibromide (Dibromoethane,1,2)								
001069340	BUTYL	014	118	65.00	24.00	23.	.04	291
				59.00	8.00	23.	.07	323
	NATURAL RUBBER	017	UNK	480.00	24.00	23.	.02	291
	NEOPRENE	018	100	500.00	24.00	23.	.04	291
	NITRILE	020	503	580.00	24.00	23.	.04	291
	PE	006	100	20.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	4.00	24.00	23.	.05	291
				.80	8.00	23.	.08	323
	PVC	007	100	258.00	8.00	23.	.02	323
	TEFLON	036	214	2.00	24.00	23.	.01	291
	VITON	009	118	3.00	24.00	23.	.02	291
				2.00	8.00	23.	.03	323
Ethylene Dichloride (Dichloroethane,1,2)								
001070620	BUTYL	014	118	36.00	8.00	23.	.06	323
			UNK	34.00	24.00	23.		326
				34.00	168.00	23.		326
		064	UNK	24.00	24.00	23.		326
				27.00	168.00	23.		326
	NATURAL RUBBER	001	250	213.00	8.00	23.	.02	323
		017	UNK	226.00	168.00	23.		326
				211.00	24.00	23.		326
	NEOPRENE	018	UNK	190.00	168.00	23.		326
				182.00	24.00	23.		326
	NITRILE	019	UNK	655.00	24.00	23.		326
				> 1,000.00	168.00	23.		326
		020	UNK	440.00	168.00	23.		326
				340.00	24.00	23.		326
	PE	041	UNK	5.00	8,760.00	23.		305
		042	UNK	16.00	168.00	23.		326
				.20	24.00	23.		326
				5.40	8,760.00	23.		305
		048	UNK	6.90	8,760.00	23.		305
		076	UNK	74.00	24.00	23.		326
				100.00	168.00	23.		326
	POLYURETHANE	050	UNK	26.00	24.00	23.		326

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CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001070620	POLYURETHANE	050	UNK	86.00	168.00	23.		326
	PV ALCOHOL	004	100	.40	8.00	23.	.03	323
		102	UNK	.30	24.00	23.		326
				.40	168.00	23.		326
	PVC	077	UNK	265.00	168.00	23.		326
				251.00	24.00	23.		326
	TEFLON	036	UNK	1.00	168.00	23.		326
				.20	24.00	23.		326
	VITON	009	118	5.00	8.00	23.	.03	323
			UNK	6.00	168.00	23.		326
				6.00	24.00	23.		326
Ethylene Glycol								
001072110	NATURAL RUBBER	001	120	1.00	.50	23.	.05	236
				1.00	.08	23.	.05	236
				2.00	1.00	23.	.05	236
				< .01	4.00	23.	.05	236
	NEOPRENE	010	120	18.00	4.00	23.	.06	236
				< .01	1.00	23.	.06	236
				6.00	.50	23.	.06	236
				< .01	.08	23.	.06	236
	NITRILE	005	120	2.00	4.00	23.	.06	236
				1.00	1.00	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
	PVC	003	120	3.00	4.00	23.	.08	236
				2.00	1.00	23.	.08	236
				8.00	.50	23.	.08	236
				< .01	.08	23.	.08	236
Ethylenimine (Aziridine)								
001515640	BUTYL	034	UNK	14.00	168.00	22.		078
	NATURAL RUBBER	017	508	15.00	168.00	22.		078
2-Ethyl-1-Hexanol								
001047670	BUTYL	014	118	4.00	8.00	23.	.07	323
	NEOPRENE	018	100	3.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-.30	8.00	23.	.09	323
	VITON	009	118	3.00	8.00	23.	.03	323
Ethylidene Dichloride (Dichloroethane,1,1)								
000753430	BUTYL	012	118	66.00	8.00	23.	.09	323
	PV ALCOHOL	004	100	-5.00	8.00	23.	.08	323
	PVC	003	100	65.00	8.00	23.	.02	323
				3.00	8.00	23.	.02	323
	VITON	009	118	12.00	8.00	23.	.04	323
Ethyl Methacrylate								
000976320	BUTYL	014	118	33.00	8.00	23.	.09	323
	NITRILE	019	100	109.00	8.00	23.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000976320	PV ALCOHOL	102	100	-4.00	8.00	23.	.06	323
	PVC	003	100	115.00	8.00	23.	.02	323
Formaldehyde, <37% (Formalin)								
000500000	NATURAL RUBBER	001	120	2.00	4.00	23.	.05	236
				1.00	1.00	23.	.05	236
				1.00	.50	23.	.05	236
				< .01	.08	23.	.05	236
	NEOPRENE	010	120	2.00	.08	23.	.06	236
				2.00	.50	23.	.06	236
				2.00	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	NITRILE	005	120	2.00	1.00	23.	.06	236
				2.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
				2.00	4.00	23.	.06	236
	PE	048	UNK	.10	8,760.00	23.		305
	PVC	003	120	< .01	.50	23.	.08	236
				17.00	.08	23.	.08	236
				1.00	1.00	23.	.08	236
				2.00	4.00	23.	.08	236
Freon TF								
000761310	NEOPRENE	010	120	4.00	4.00	23.	.06	236
				1.00	1.00	23.	.06	236
				< .01	.08	23.	.06	236
				1.00	.50	23.	.06	236
	NITRILE	005	120	1.00	4.00	23.	.06	236
				1.00	1.00	23.	.06	236
				< .01	.50	23.	.06	236
				1.00	.08	23.	.06	236
Furan (Furfuran)								
001100090	BUTYL	014	118	46.00	8.00	23.	.09	323
	PV ALCOHOL	102	100	-22.00	8.00	23.	.09	323
	PVC	003	100	-49.00	8.00	23.	.02	323
	VITON	009	118	17.00	8.00	23.	.05	323
Gasoline								
080066190	NEOPRENE	010	120	2.00	.08	23.	.06	236
				8.00	.50	23.	.06	236
				7.00	1.00	23.	.06	236
				9.00	4.00	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				2.00	.50	23.	.06	236
				2.00	1.00	23.	.06	236
				4.00	4.00	23.	.06	236
	PE	041	UNK	6.70	8,760.00	23.		305
		042	UNK	8.80	8,760.00	23.		305
		048	UNK	13.50	8,760.00	23.		305
[illegible]								
[illegible]	BUTYL	014	118	1.00	8.00	23.	.09	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001113080	NEOPRENE	018	100	4.00	8.00	23.	.05	323
	PVC	003	100	7.00	8.00	23.	.02	323
	VITON	009	118	4.00	8.00	23.	.04	323
Halothane								
001516770	BUTYL	014	118	210.00	8.00	23.	.09	323
	PV ALCOHOL	102	100	-22.00	8.00	23.	.07	323
	PVC	007	100	-35.00	8.00	23.	.02	323
	VITON	009	118	81.00	8.00	23.	.05	323
Heptane								
001428250	PE	041	UNK	.70	8,760.00	23.		305
		042	UNK	6.90	8,760.00	23.		305
		048	UNK	10.00	8,760.00	23.		305
Hexachlorocyclopentadiene								
000774740	BUTYL	014	118	26.00	8.00	23.	.06	323
	NITRILE	019	100	19.00	8.00	23.	.04	323
	PV ALCOHOL	102	100	2.00	8.00	23.	.08	323
	VITON	009	118	2.00	8.00	23.	.03	323
Hexamethylphosphoamide								
006803190	BUTYL	034	UNK	8.00	168.00	22.		078
	NEOPRENE	031	UNK	272.00	168.00	22.		078
	NITRILE	033	UNK	78.00	168.00	22.		078
	PE	006	209	22.00	168.00	22.		078
	POLYURETHANE	050	178	242.00	168.00	22.		078
	VITON	032	UNK	250.00	168.00	22.		078
Hexane								
001105430	NEOPRENE	010	120	4.00	4.00	23.	.06	236
				28.00	1.00	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				< .01	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
Hydrochloric Acid								
076470100	BUTYL	034	UNK	11.00	20.00	25.		126
				.90	3.00	25.		126
	POLYCARBONATE	098	UNK	< .01	3.00	25.		126
				< .01	20.00	25.		126
Hydrochloric Acid, <30%								
076470101	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	.20	8,760.00	23.		305
Hydrochloric Acid, 30-70%								
076470102	NATURAL RUBBER	001	120	1.00	.08	23.	.05	236
				2.00	.50	23.	.05	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
076470102	NATURAL RUBBER	001	120	3.00	1.00	23.	.05	236
				5.00	4.00	23.	.05	236
	NEOPRENE	010	120	1.00	.08	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				2.00	4.00	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				2.00	.50	23.	.06	236
				2.00	1.00	23.	.06	236
				3.00	4.00	23.	.06	236
	PVC	003	120	< .01	.08	23.	.08	236
				1.00	.50	23.	.08	236
				1.00	1.00	23.	.08	236
				2.00	4.00	23.	.08	236
Hydrofluoric Acid (Hydrogen Fluoride)								
076643930	BUTYL	034	UNK	123.00	3.00	25.		126
	POLYCARBONATE	098	UNK	.30	3.00	25.		126
				1.00	20.00	25.		126
Hydrofluoric Acid, 30-70%								
076643932	NATURAL RUBBER	001	120	< .01	4.00	23.	.05	236
				< .01	1.00	23.	.05	236
				1.00	.50	23.	.05	236
				1.00	.08	23.	.05	236
	NEOPRENE	010	120	2.00	.08	23.	.06	236
				4.00	.50	23.	.06	236
				4.00	1.00	23.	.06	236
				8.00	4.00	23.	.06	236
	NITRILE	005	120	2.00	.08	23.	.06	236
				6.00	.50	23.	.06	236
				7.00	1.00	23.	.06	236
				11.00	4.00	23.	.06	236
	PVC	003	120	1.00	.08	23.	.08	236
				2.00	.50	23.	.08	236
				2.00	1.00	23.	.08	236
				2.00	4.00	23.	.08	236
Hydrogen Peroxide, 30-70%								
077228412	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	.10	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Iminobispropylamine								
000561880	BUTYL	014	118	4.00	8.00	28.	.09	323
	NATURAL RUBBER	001	250	21.00	8.00	26.	.02	323
	NEOPRENE	018	100	24.00	8.00	27.	.05	323
	VITON	009	118	3.00	8.00	27.	.04	323
Isobutyl Acrylate								
001066380	BUTYL	014	118	16.00	8.00	23.	.09	323
	NITRILE	019	100	103.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-2.00	8.00	23.	.08	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001066380	PVC	003	100	94.00	8.00	23.	.02	323
Isobutyl Alcohol								
000788310	BUTYL	014	118	.06	8.00	23.	.07	323
	NEOPRENE	018	100	-3.00	8.00	23.	.05	323
	NITRILE	019	118	7.00	8.00	23.	.05	323
	VITON	009	118	.02	8.00	23.	.05	323
Isobutyl Nitrite								
005425630	BUTYL	014	118	81.00	8.00	23.	.04	323
	NITRILE	019	100	38.00	8.00	23.	.06	323
	PVC	003	100	-31.00	8.00	23.	.02	323
	VITON	009	118	50.00	8.00	23.	.04	323
Isopropyl Alcohol (Propanol, 2-)								
000676300	CPE	060	113	3.10	24.00	23.	.05	204
				3.70	24.00	23.	.05	204
				3.50	24.00	23.	.05	204
	NATURAL RUBBER	001	120	1.00	.08	23.	.05	236
				1.00	.50	23.	.05	236
				1.00	1.00	23.	.05	236
				1.00	4.00	23.	.05	236
	NEOPRENE	010	120	< .01	.08	23.	.06	236
				1.00	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				< .01	4.00	23.	.06	236
	NITRILE	005	120	2.00	4.00	23.	.06	236
				2.00	1.00	23.	.06	236
				2.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
	PVC	003	120	< .01	4.00	23.	.08	236
				< .01	1.00	23.	.08	236
				1.00	.50	23.	.08	236
				< .01	.08	23.	.08	236
Isopropylamine								
000753100	BUTYL	014	118	28.00	8.00	24.	.09	323
	NEOPRENE	018	100	60.00	8.00	21.	.05	323
	PVC	007	100	-18.00	8.00	18.	.02	323
	VITON	009	118	67.00	8.00	26.	.04	323
Isopropylmethacrylate								
046553490	BUTYL	014	118	36.00	8.00	23.	.09	323
	NITRILE	019	100	69.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-3.00	8.00	23.	.09	323
	PVC	003	100	63.00	8.00	23.	.02	323
Kerosene								
080082060	NEOPRENE	010	120	1.00	.08	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				3.00	4.00	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
080082060	NITRILE	005	120	1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				2.00	4.00	23.	.06	236
Methacrylonitrile								
001269870	BUTYL	014	118	-1.00	8.00	23.	.09	323
	NATURAL RUBBER	001	250	7.00	8.00	23.	.02	323
	PV ALCOHOL	102	100	-6.00	8.00	23.	.06	323
	PVC	003	100	10.00	8.00	23.	.02	323
Methanol (Methyl Alcohol)								
000675610	NATURAL RUBBER	001	120	1.00	.08	23.	.05	236
				2.00	1.00	23.	.05	236
				2.00	4.00	23.	.05	236
				1.00	.50	23.	.05	236
	NEOPRENE	010	120	< .01	.08	23.	.06	236
				< .01	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	NITRILE	005	120	7.00	4.00	23.	.06	236
				6.00	1.00	23.	.06	236
				3.00	.50	23.	.06	236
				3.00	.08	23.	.06	236
Methanol, <30%								
000675611	PE	041	UNK	.10	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Methanol, >70%								
000675613	PE	041	UNK	.10	8,760.00	23.		305
		042	UNK	.10	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Methyl Acetate								
000792090	BUTYL	014	118	1.00	8.00	23.	.09	323
	NATURAL RUBBER	001	250	-20.00	8.00	23.	.02	323
	PV ALCOHOL	102	100	-25.00	8.00	23.	.07	323
	PVC	003	100	12.00	8.00	23.	.02	323
Methyl Acrylate								
000963330	BUTYL	014	118	5.00	8.00	23.	.09	323
	NATURAL RUBBER	001	250	54.00	8.00	23.	.02	323
	NEOPRENE	018	100	50.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-4.00	8.00	23.	.07	323
3-Methylaminopropylamine								
062918450	BUTYL	014	118	5.00	8.00	20.	.07	323
	NATURAL RUBBER	001	250	30.00	8.00	16.	.02	323
	NEOPRENE	018	100	70.00	8.00	16.	.05	323
	PVC	007	100	45.00	8.00	14.	.02	323
Methyl Chloroform (Trichloroethane,1,1,1)								

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000715560	BUTYL	014	UNK	80.00	168.00	25.		326
				80.00	24.00	25.		326
				5.50	24.00	22.		201
		064	UNK	47.00	24.00	25.		326
				49.00	168.00	25.		326
	NATURAL RUBBER	017	UNK	464.00	24.00	25.		326
				.30	24.00	22.		201
				473.00	168.00	25.		326
	NEOP/NAT RUBBER	008	UNK	-.30 - .30	24.00	22.		201
	NEOPRENE	010	120	21.00	.08	23.	.06	236
				78.00	.50	23.	.06	236
				86.00	1.00	23.	.06	236
				92.00	4.00	23.	.06	236
		018	UNK	291.00	168.00	25.		326
				290.00	24.00	25.		326
				15.50	24.00	22.		201
				-.50 - .50	24.00	22.		201
				2.80	24.00	22.		201
	NITRILE	005	120	36.00	4.00	23.	.06	236
				82.00	1.00	23.	.06	236
				62.00	.50	23.	.06	236
				25.00	.08	23.	.06	236
		019	UNK	> 1,000.00	24.00	25.		326
		020	UNK	2.50	24.00	22.		201
	PE	042	UNK	16.00	168.00	25.		326
				5.00	24.00	25.		326
		076	UNK	131.00	24.00	25.		326
				147.00	168.00	25.		326
	POLYURETHANE	050	UNK	58.00	24.00	25.		326
				79.00	168.00	25.		326
	PV ALCOHOL	102	UNK	.80	24.00	25.		326
				6.90	24.00	22.		201
				.90	168.00	25.		326
	PVC	003	UNK	-2.50	24.00	22.		201
		077	UNK	227.00	24.00	25.		326
				273.00	168.00	25.		326
	TEFLON	036	UNK	.30	24.00	25.		326
				.40	168.00	25.		326
	VITON	009	UNK	4.00	24.00	25.		326
				5.00	168.00	25.		326
Methyl Chloroformate								
000792210	BUTYL	034	UNK	13.00	20.00	25.		126
				11.00	3.00	25.		126
Methylene Chloride (Dichloromethane)								
000750920	NATURAL RUBBER	001	UNK	-3.00	1.00	25.		208
	NEOPRENE	002	UNK	-3.00	1.00	25.		208
		010	120	17.00	.08	23.	.06	236
				25.00	.50	23.	.06	236
				20.00	1.00	23.	.06	236
				4.00	4.00	23.	.06	236
	NITRILE	005	UNK	-3.00	1.00	25.		208

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
n-Methylethanolamine								
001098310	BUTYL	014	118	2.00	8.00	19.	.07	323
	CELLULOSE ACETATE	099	118	9.00	8.00	20.	.03	323
	NATURAL RUBBER	001	250	8.00	8.00	20.	.02	323
	NEOPRENE	018	100	4.00	8.00	20.	.06	323
Methyl Ethyl Ketone (Butanone,2)								
000789330	BUTYL	014	118	6.00	8.00	23.	.06	323
	NATURAL RUBBER	001	120	10.00	.50	23.	.05	236
				6.00	4.00	23.	.05	236
				8.00	.08	23.	.05	236
				12.00	1.00	23.	.05	236
			250	37.00	8.00	23.	.01	323
			UNK	-2.00	1.00	25.		208
	NEOPRENE	002	UNK	-3.00	1.00	25.		208
		010	120	8.00	4.00	23.	.06	236
				16.00	1.00	23.	.06	236
				14.00	.50	23.	.06	236
				5.00	.08	23.	.06	236
		018	100	88.00	8.00	23.	.05	323
	NITRILE	005	UNK	-2.00	1.00	25.		208
	PV ALCOHOL	102	100	-14.00	8.00	23.	.07	323
Methylhydrazine								
000603440	BUTYL	034	UNK	6.70	20.00	25.		126
				3.40	3.00	25.		126
Methyl Iodide								
000748840	BUTYL	014	118	208.00	8.00	23.	.09	323
	NEOPRENE	018	100	511.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-18.00	8.00	23.	.07	323
	VITON	009	118	4.00	8.00	23.	.04	323
Methyl Isocyanate								
006248390	BUTYL	014	118	32.00	8.00	13.	.06	323
				32.00	8.00	23.	.07	323
	NATURAL RUBBER	001	250	49.00	8.00	20.	.02	323
				49.00	8.00	23.	.01	323
	NEOPRENE	018	100	90.00	8.00	20.	.05	323
	PV ALCOHOL	004	100	6.00	8.00	23.	.03	323
	VITON	009	118	74.00	8.00	21.	.03	323
				74.00	8.00	23.	.03	323
Methyl Methacrylate								
000806260	BUTYL	014	118	23.00	8.00	23.	.09	323
	NATURAL RUBBER	001	250	112.00	8.00	23.	.02	323
	PV ALCOHOL	102	100	-7.00	8.00	23.	.06	323
	PVC	003	100	102.00	8.00	23.	.02	323
Monoisopropanolamine								
000789660	BUTYL	014	118	2.00	8.00	25.	.07	323
	NEOPRENE	018	100	6.00	8.00	24.	.05	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000789660	PVC	007	100	6.00	8.00	25.	.02	323
	VITON	009	118	7.00	8.00	25.	.04	323
Nitric Acid, >70%								
076973723	NATURAL RUBBER	001	120	6.00	.50	23.	.05	236
				3.00	.08	23.	.05	236
				8.00	1.00	23.	.05	236
				12.00	4.00	23.	.05	236
	NEOPRENE	010	120	1.00	.08	23.	.06	236
				2.00	.50	23.	.06	236
				3.00	1.00	23.	.06	236
				7.00	4.00	23.	.06	236
	NITRILE	005	120	9.00	.08	23.	.06	236
				17.00	.50	23.	.06	236
				20.00	1.00	23.	.06	236
				34.00	4.00	23.	.06	236
	PE	041	UNK	1.40	8,760.00	23.		305
		042	UNK	1.90	8,760.00	23.		305
		048	UNK	4.80	8,760.00	23.		305
				4.80	8,760.00	23.		305
	PVC	003	120	2.00	.08	23.	.08	236
				3.00	.50	23.	.08	236
				4.00	1.00	23.	.08	236
				5.00	4.00	23.	.08	236
Nitrobenzene								
000989530	BUTYL	034	UNK	15.00	20.00	25.		126
				4.20	3.00	25.		126
Nitroethane								
000792430	BUTYL	014	118	.30	8.00	23.	.09	323
	NATURAL RUBBER	001	250	2.00	8.00	23.	.02	323
	NEOPRENE	018	100	23.00	8.00	23.	.04	323
	PV ALCOHOL	102	100	-1.00	8.00	23.	.07	323
Nitromethane								
000755250	BUTYL	014	118	-.50	8.00	23.	.09	323
	NATURAL RUBBER	001	250	-4.00	8.00	23.	.02	323
	NEOPRENE	018	100	4.00	8.00	23.	.05	323
	PV ALCOHOL	102	100	-2.00	8.00	23.	.07	323
Nitropropane								
253220140	BUTYL	034	UNK	2.00	168.00	22.		078
	NEOPRENE	031	UNK	23.00	168.00	22.		078
	NITRILE	033	UNK	72.00	168.00	22.		078
	PE	006	209	7.00	168.00	22.		078
	POLYURETHANE	050	178	99.00	168.00	22.		078
	PV ALCOHOL	035	UNK	< 1.00	168.00	22.		078
	PVC	077	168	42.00	168.00	22.		078
	VITON	032	UNK	107.00	168.00	22.		078
2-Nitropropane								
000794690	BUTYL	014	118	-.50	8.00	23.	.08	323

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000794690	NATURAL RUBBER	001	250	18.00	8.00	23.	.02	323
	NEOPRENE	018	100	53.00	8.00	23.	.04	323
	PV ALCOHOL	102	100	-2.00	8.00	23.	.06	323
n-Nitrosodimethylamine								
000551850	CPE	060	113	115.00	.83	23.	.05	204
				112.00	.83	23.	.05	204
				109.00	.33	23.	.05	204
o-Nitrotoluene								
000887220	BUTYL	034	UNK	15.20	20.00	25.		126
				9.90	3.00	25.		126
p-Nitrotoluene								
000999900	BUTYL	034	UNK	.10	3.00	25.		126
				.20	20.00	25.		126
	POLYCARBONATE	098	UNK	.20	3.00	25.		126
				2.00	20.00	25.		126
Oleic Acid								
001128010	PE	041	UNK	1.40	8,760.00	23.		305
		042	UNK	1.70	8,760.00	23.		305
		048	UNK	2.40	8,760.00	23.		305
Oxalic Acid								
001446270	BUTYL	014	118	1.00	8.00	19.	.07	323
	NEOPRENE	018	100	3.00	8.00	19.	.05	323
	NITRILE	019	100	2.00	8.00	19.	.04	323
	VITON	009	118	.90	8.00	20.	.03	323
Phenol (Carbolic Acid)								
001089520	CPE	060	113	9.10	24.00	23.	.05	204
				68.00	24.00	23.	.05	204
				25.00	24.00	23.	.05	204
	NATURAL RUBBER	001	120	12.00	4.00	23.	.05	236
				2.00	1.00	23.	.05	236
				3.00	.50	23.	.05	236
				2.00	.08	23.	.05	236
	NEOPRENE	010	120	5.00	4.00	23.	.06	236
				1.00	1.00	23.	.06	236
				2.00	.50	23.	.06	236
				2.00	.08	23.	.06	236
Phenol, <30%								
001089521	PE	041	UNK	.20	8,760.00	23.		305
		042	UNK	.10	8,760.00	23.		305
		048	UNK	.20	8,760.00	23.		305
Phenyl Glycidyl Ether								
001226010	BUTYL	014	UNK	.40	24.00	22.		201
	NATURAL RUBBER	017	UNK	6.00	24.00	22.		201
	NEOP/NAT RUBBER	008	UNK	30.00	24.00	22.		201
	NEOPRENE	018	UNK	37.70	24.00	22.		201

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001226010	NEOPRENE	018	UNK	23.00	24.00	22.		201
				33.10	24.00	22.		201
	NITRILE	020	UNK	103.50	24.00	22.		201
	PV ALCOHOL	102	UNK	3.80	24.00	22.		201
	PVC	003	UNK	41.40	24.00	22.		201
Phosphoric Acid, >70%								
076643823	NATURAL RUBBER	001	120	3.00	4.00	23.	.05	236
				3.00	1.00	23.	.05	236
				2.00	.50	23.	.05	236
				1.00	.08	23.	.05	236
	NEOPRENE	010	120	< .01	.08	23.	.06	236
				< .01	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				< .01	4.00	23.	.06	236
	NITRILE	005	120	< .01	.08	23.	.06	236
				1.00	.50	23.	.06	236
				4.00	1.00	23.	.06	236
				5.00	4.00	23.	.06	236
	PVC	003	120	1.00	.08	23.	.08	236
				2.00	.50	23.	.08	236
				2.00	1.00	23.	.08	236
				2.00	4.00	23.	.08	236
Potassium Hydroxide, 30-70%								
013105832	NATURAL RUBBER	001	120	2.00	4.00	23.	.05	236
				2.00	1.00	23.	.05	236
				2.00	.50	23.	.05	236
				1.00 - .01	.08	23.	.05	236
	NEOPRENE	010	120	< .01	4.00	23.	.06	236
				< .01	1.00	23.	.06	236
				< .01	.50	23.	.06	236
				< .01	.08	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				< .01	4.00	23.	.06	236
	PVC	003	120	1.00	4.00	23.	.08	236
				< .01	1.00	23.	.08	236
				1.00	.50	23.	.08	236
				1.00	.08	23.	.08	236
beta-Propiolactone								
000575780	BUTYL	034	UNK	1.00	168.00	22.		078
	NATURAL RUBBER	017	508	9.00	168.00	22.		078
	NEOPRENE	031	UNK	31.00	168.00	22.		078
	NITRILE	033	UNK	29.00	168.00	22.		078
	PE	006	209	18.00	168.00	22.		078
	POLYURETHANE	050	178	185.00	168.00	22.		078
	PVC	077	168	15.00	168.00	22.		078
	VITON	032	UNK	69.00	168.00	22.		078
n-Propylamine								

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001071080	BUTYL	034	UNK	17.00	20.00	25.		126
				14.00	3.00	25.		126
Propylenediamine								
000789000	BUTYL	014	118	-3.00	8.00	17.	.07	323
	NEOPRENE	018	100	1.00	8.00	24.	.05	323
	PVC	007	100	5.00	8.00	17.	.02	323
	VITON	009	118	8.00	8.00	25.	.02	323
Propylene Dichloride (Dichloropropane 1,2)								
000788750	BUTYL	014	118	70.00	8.00	23.	.08	323
	PV ALCOHOL	102	100	-2.00	8.00	23.	.07	323
	PVC	007	100	105.00	8.00	23.	.02	323
	VITON	009	118	7.00	8.00	23.	.03	323
1,3-Propylene Oxide								
005033000	BUTYL	014	118	21.00	8.00	23.	.07	323
	NATURAL RUBBER	001	250	58.00	8.00	23.	.02	323
	PV ALCOHOL	004	100	-9.00	8.00	23.	.03	323
	VITON	009	118	94.00	8.00	23.	.03	323
Propylmethacrylate								
022102880	BUTYL	014	118	38.00	8.00	23.	.08	323
	NITRILE	019	100	152.00	8.00	23.	.04	323
	PV ALCOHOL	004	100	-.60	8.00	23.	.07	323
	PVC	003	100	106.00	8.00	23.	.02	323
Sodium Hydroxide, <30%								
013107321	PE	041	UNK	.10	8,760.00	23.		305
				.10	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
				< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
				.10	8,760.00	23.		305
Sodium Hydroxide, 30-70%								
013107322	NATURAL RUBBER	001	120	2.00	4.00	23.	.05	236
				1.00	1.00	23.	.05	236
				2.00	.50	23.	.05	236
				2.00	.08	23.	.05	236
			UNK	-1.00	1.00	25.		208
	NEOPRENE	002	UNK	-1.00	1.00	25.		208
		010	120	2.00	4.00	23.	.06	236
				4.00	1.00	23.	.06	236
				3.00	.50	23.	.06	236
				1.00	.08	23.	.06	236
	NITRILE	005	120	2.00	.08	23.	.06	236
				7.00	.50	23.	.06	236
				3.00	1.00	23.	.06	236
				3.00	4.00	23.	.06	236
			UNK	1.00	1.00	25.		208
	PVC	003	120	8.00	.08	23.	.08	236
				6.00	.50	23.	.08	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
013107322	PVC	003	120	7.00	1.00	23.	.08	236
				3.00	4.00	23.	.08	236
Sulfuric Acid, <30%								
076649391	PE	041	UNK	.10	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
Sulfuric Acid, 30-70%								
076649392	NATURAL RUBBER	001	120	2.00	4.00	23.	.05	236
				1.00	1.00	23.	.05	236
				2.00	.50	23.	.05	236
				1.00	.08	23.	.05	236
	NEOPRENE	010	120	2.00	.08	23.	.06	236
				3.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	NITRILE	005	120	1.00	.08	23.	.06	236
				2.00	.50	23.	.06	236
				< .01	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	PE	041	UNK	< .01	8,760.00	23.		305
		042	UNK	< .01	8,760.00	23.		305
		048	UNK	< .01	8,760.00	23.		305
	PVC	003	120	1.00	.08	23.	.08	236
				< .01	.50	23.	.08	236
				1.00	1.00	23.	.08	236
				1.00	4.00	23.	.08	236
Tannic Acid, >70%								
014015543	NATURAL RUBBER	001	UNK	10.00	1.00	25.		208
	NEOPRENE	002	UNK	7.00	1.00	25.		208
	NITRILE	005	UNK	56.00	1.00	25.		208
1,1,1,2-Tetrachloroethane								
006302060	BUTYL	014	118	128.00	8.00	23.	.07	323
	PV ALCOHOL	102	100	-3.00	8.00	23.	.08	323
	PVC	007	100	83.00	8.00	23.	.02	323
	VITON	009	118	2.00	8.00	23.	.03	323
1,1,2,2-Tetrachloroethane								
000793450	BUTYL	014	118	167.00	8.00	23.	.07	323
	PV ALCOHOL	004	100	.10	8.00	23.	.04	323
	PVC	007	100	247.00	8.00	23.	.02	323
	VITON	009	118	.80	8.00	23.	.03	323
Tetrachloroethylene (Perchloroethylene)								
001271840	BUTYL	014	118	510.00	24.00	23.	.04	291
	NATURAL RUBBER	017	UNK	770.00	24.00	23.	.02	291
	NEOPRENE	018	100	360.00	24.00	23.	.04	291
	NITRILE	005	120	8.00	.08	23.	.06	236
				11.00	.50	23.	.06	236
				11.00	1.00	23.	.06	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

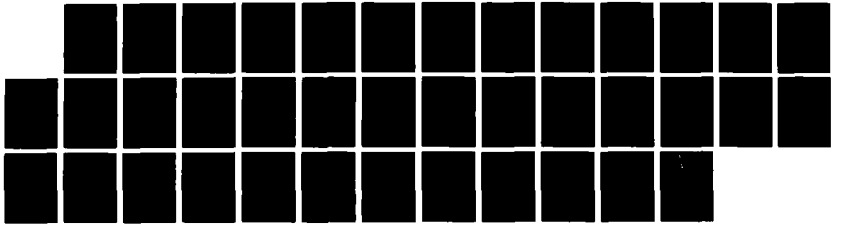
CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001271840	NITRILE	005	120	22.00	4.00	23.	.06	236
		020	191	95.00	24.00	23.	.04	291
	PE	006	100	15.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	-6.00	24.00	23.	.05	291
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	4.00	24.00	23.	.02	291
Tetraethylenepentamine								
001125720	BUTYL	012	118	3.00	8.00	25.	.09	323
	NATURAL RUBBER	017	506	17.00	8.00	28.	.02	323
	NEOPRENE	018	100	11.00	8.00	27.	.05	323
	VITON	009	118	3.00	8.00	23.	.04	323
N,N,N',N'-Tetramethylenediamine								
001101890	BUTYL	012	118	156.00	8.00	20.	.07	323
		014	118	156.00	8.00	23.	.07	323
	NITRILE	019	100	37.00	8.00	23.	.05	323
				37.00	8.00	24.	.05	323
	PVC	003	100	3.00	8.00	23.	.02	323
	VITON	009	118	31.00	8.00	23.	.04	323
				31.00	8.00	24.	.04	323
Toluene								
001088830	BUTYL	014	UNK	2.00	24.00	22.		201
	NATURAL RUBBER	001	UNK	-2.00	1.00	25.		208
		017	UNK	.04	24.00	22.		201
	NEOP/NAT RUBBER	008	UNK	-.04	24.00	22.		201
	NEOPRENE	002	UNK	-3.00	1.00	25.		208
		018	UNK	.50	24.00	22.		201
				-.50 - .50	24.00	22.		201
				.80	24.00	22.		201
	NITRILE	005	120	25.00	1.00	23.	.06	236
				33.00	.50	23.	.06	236
				17.00	.08	23.	.06	236
				27.00	4.00	23.	.06	236
			UNK	-1.00	1.00	25.		208
		020	UNK	2.50	24.00	22.		201
	PE	041	UNK	7.50	8,760.00	23.		305
		042	UNK	9.80	8,760.00	23.		305
		048	UNK	15.10	8,760.00	23.		305
	PV ALCOHOL	102	UNK	10.50	24.00	22.		201
	PVC	003	UNK	-29.00	24.00	22.		201
Toluene Diisocyanate								
264716250	NATURAL RUBBER	001	120	25.00	4.00	23.	.05	236
				15.00	1.00	23.	.05	236
				9.00	.50	23.	.05	236
				4.00	.08	23.	.05	236
	PVC	003	120	32.00	4.00	23.	.08	236
				26.00	1.00	23.	.08	236
				14.00	.50	23.	.08	236
				6.00	.08	23.	.08	236

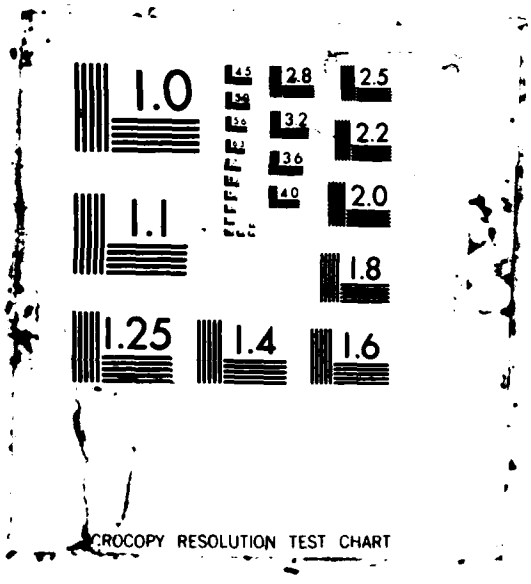
SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
Triallylamine								
001027050	NEOPRENE	018	100	31.00	8.00	19.	.05	323
	NITRILE	019	100	4.00	8.00	22.	.04	323
	PVC	007	100	-20.00	8.00	20.	.02	323
	VITON	009	118	1.00	8.00	17.	.03	323
Trichloroacetaldehyde (Chloral)								
000758760	BUTYL	014	118	105.00	8.00	23.	.07	323
	PV ALCOHOL	102	100	-.30	8.00	23.	.08	323
	PVC	007	100	125.00	8.00	23.	.02	323
	VITON	009	118	19.00	8.00	23.	.03	323
1,1,2-Trichloroethane								
000790050	BUTYL	014	118	80.00	8.00	23.	.09	323
			UNK	80.00	24.00	23.		326
				80.00	168.00	23.		326
		064	UNK	49.00	168.00	23.		326
				47.00	24.00	23.		326
	NATURAL RUBBER	001	UNK	-2.00	1.00	25.		208
		017	UNK	473.00	168.00	23.		326
				464.00	24.00	23.		326
	NEOPRENE	002	UNK	-3.00	1.00	25.		208
		018	UNK	290.00	24.00	23.		326
				291.00	168.00	23.		326
	NITRILE	005	UNK	-3.00	1.00	25.		208
		019	UNK	> 1,000.00	168.00	23.		326
				> 1,000.00	24.00	23.		326
	PE	042	UNK	5.00	24.00	23.		326
				16.00	168.00	23.		326
		076	UNK	131.00	24.00	23.		326
				147.00	168.00	23.		326
	POLYURETHANE	050	UNK	79.00	168.00	23.		326
				58.00	24.00	23.		326
	PV ALCOHOL	102	100	-2.00	8.00	23.	.07	323
			UNK	.80	24.00	23.		326
				.90	168.00	23.		326
	PVC	003	118	238.00	8.00	23.	.02	323
		077	UNK	227.00	24.00	23		326
				273.00	168.00	23		326
	TEFLON	036	UNK	.40	168.00	23		326
				.30	24.00	23		326
	VITON	009	118	3.00	8.00	23		326
			UNK	5.00	168.00	23		326
				4.00	24.00	23		326
Trichloroethylene (Trichloroethene)								
000790160	BUTYL	014	118	440.00	24.00	23		
		034	UNK	148.00	168.00	23		
	NATURAL RUBBER	001	UNK	-3.00	1.00	25		
		017	UNK	700.00	24.00	23		
	NEOPRENE	002	UNK	-3.00	1.00	25		
		018	100	400.00	24.00	23		

AD-A179 164 GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING VOLUME 2 TEC..(U) LITTLE (ARTHUR D) INC CAMBRIDGE MA A D SCHWOPE ET AL. FEB 87 USCG-D-8-87 3/3

UNCLASSIFIED DTCG23-85-F-20032 F/G 6/17 NL

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CROCOPY RESOLUTION TEST CHART

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000790160	NEOPRENE	031	UNK	118.00	168.00	22.		078
	NITRILE	005	120	29.00	4.00	23.	.06	236
				51.00	1.00	23.	.06	236
				58.00	.50	23.	.06	236
				40.00	.08	23.	.06	236
			UNK	-1.00	1.00	25.		208
		020	503	310.00	24.00	23.	.04	291
		033	UNK	217.00	168.00	22.		078
	PE	006	100	20.00	24.00	23.	.01	291
			209	6.00	168.00	22.		078
	POLYURETHANE	050	178	115.00	168.00	22.		078
	PV ALCOHOL	035	UNK	3.00	168.00	22.		078
		102	100	-2.00	24.00	23.	.05	291
	PVC	077	168	14.00	168.00	22.		078
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	8.00	24.00	23.	.02	291
		032	UNK	2.00	168.00	22.		078
1,2,3-Trichloropropane								
000961840	BUTYL	014	118	19.00	8.00	23.	.06	323
	NITRILE	019	100	182.00	8.00	23.	.04	323
	PV ALCOHOL	004	100	4.00	8.00	23.	.03	323
	VITON	009	118	.50	8.00	23.	.03	323
Tricresyl Phosphate (Tritolyl Phosphate)								
013307850	BUTYL	012	118	1.00	8.00	23.	.07	323
	PVC	003	100	.40	8.00	23.	.02	323
	VITON	009	118	2.00	8.00	23.	.04	323
Triethylamine								
001214480	NEOPRENE	018	100	70.00	8.00	20.	.05	323
	NITRILE	019	118	6.20	8.00	19.	.04	323
	PVC	007	100	-28.00	8.00	20.	.02	323
	VITON	009	118	2.00	8.00	24.	.03	323
Triethylenetetraamine								
001122430	BUTYL	014	118	3.00	8.00	20.	.06	323
	NEOPRENE	018	100	6.00	8.00	19.	.05	323
	NITRILE	019	100	23.00	8.00	16.	.04	323
	VITON	009	118	6.00	8.00	20.	.03	323
Tri-n-propylamine								
001026920	NEOPRENE	018	100	15.00	8.00	23.	.05	323
	NITRILE	019	100	.70	8.00	23.	.04	323
	PV ALCOHOL	102	100	-14.00	8.00	23.	.06	323
	VITON	009	118	-1.00	8.00	23.	.04	323
Turpentine								
080066420	NEOPRENE	010	120	1.00	.08	23.	.06	236
				3.00	.50	23.	.06	236
				4.00	1.00	23.	.06	236
				10.00	4.00	23.	.06	236
	NITRILE	005	120	< .01	.08	23.	.06	236

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION WEIGHT CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT WEIGHT CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
080066420	NITRILE	005	120	1.00	.50	23.	.06	236
				1.00	1.00	23.	.06	236
				1.00	4.00	23.	.06	236
	PE	041	UNK	7.20	8,760.00	23.		305
		042	UNK	9.10	8,760.00	23.		305
		048	UNK	14.50	8,760.00	23.		305
Valeronitrile								
001105980	BUTYL	014	118	.70	8.00	23.	.07	323
	NATURAL RUBBER	017	506	32.00	8.00	23.	.02	323
	NEOPRENE	018	100	58.00	8.00	23.	.05	323
	PV ALCOHOL	004	100	-4.00	8.00	23.	.07	323
4-Vinyl-1-cyclohexene								
001004030	BUTYL	012	118	102.00	8.00	23.	.07	323
	NITRILE	019	100	21.00	8.00	23.	.04	323
	PV ALCOHOL	004	100	-1.00	8.00	23.	.09	323
	VITON	009	118	.60	8.00	23.	.04	323
Xylene								
001332070	NITRILE	005	120	10.00	.08	23.	.06	236
				19.00	.50	23.	.06	236
				27.00	1.00	23.	.06	236
				35.00	4.00	23.	.06	236
		019	100	82.00	8.00	23.	.05	323
	PE	041	UNK	7.90	8,760.00	23.		305
		042	UNK	10.30	8,760.00	23.		305
		048	UNK	15.40	8,760.00	23.		305
	PV ALCOHOL	102	100	-4.00	8.00	23.	.09	323
	PVC	003	100	-7.00	8.00	23.	.02	323
	VITON	009	118	1.00	8.00	23.	.04	323
o-Xylene								
000954760	CPE	060	113	116.00	.60	23.	.05	204
				112.00	.60	23.	.05	204
				109.00	.73	23.	.05	204

APPENDIX C

SWELLING DATA

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION SWELLING TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	SWELL (PERCENT VOLUME)	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
Benzene								
000714320	BUTYL	014	UNK	124.00	24.00	23.		327
		064	UNK	82.00	24.00	23.		327
	NATURAL RUBBER	017	UNK	377.00	24.00	23.		327
				383.00	24.00	23.		327
	NEOPRENE	018	UNK	284.00	24.00	23.		327
	NITRILE	019	UNK	182.00	24.00	23.		327
	NONWOVEN PE	071	UNK	166.00	24.00	23.		327
	PE	042	UNK	37.00	24.00	23.		327
		076	UNK	14.00	24.00	23.		327
	PVC	003	UNK	-18.00	24.00	23.		327
	SARANEX	061	UNK	71.00	24.00	23.		327
	TEFLON	036	UNK	6.40	24.00	23.		327
	VITON	009	UNK	18.00	24.00	23.		327
Dibutylamine								
001119220	NITRILE	019	100	28.00	8.00	24.	.04	323
	PV ALCOHOL	102	100	-26.00	8.00	23.	.08	323
	PVC	007	100	-26.00	8.00	20.	.02	323
	VITON	009	118	.40	8.00	20.	.03	323
Epichlorohydrin								
001068980	BUTYL	014	118	< .01	24.00	23.	.04	291
	NATURAL RUBBER	017	UNK	30.00	24.00	23.	.02	291
	NEOPRENE	018	100	120.00	24.00	23.	.04	291
	NITRILE	020	503	240.00	24.00	23.	.04	291
	PE	006	100	15.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	-7.00	24.00	23.	.05	291
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	35.00	24.00	23.	.02	291
Ethylene Dibromide (Dibromoethane,1,2)								
001069340	BUTYL	014	118	30.00	24.00	23.	.04	291
	NATURAL RUBBER	017	UNK	240.00	24.00	23.	.02	291
	NEOPRENE	018	100	> 1,000.00	24.00	23.	.04	291
	NITRILE	020	503	230.00	24.00	23.	.04	291
	PE	006	100	35.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	< .01	24.00	23.	.05	291
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	< .01	24.00	23.	.02	291
Ethylene Dichloride (Dichloroethane,1,2)								
001070620	BUTYL	014	UNK	19.00	24.00	23.		326
				19.00	4.00	23.		326
				19.00	1.00	23.		326
		064	UNK	25.00	24.00	23.		326
				25.00	4.00	23.		326
				25.00	1.00	23.		326
	NATURAL RUBBER	017	UNK	118.00	1.00	23.		326
				124.00	24.00	23.		326
				118.00	4.00	23.		326
	NEOPRENE	018	UNK	141.00	4.00	23.		326

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION SWELLING TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	SWELL (PERCENT VOLUME)	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
001070620	NEOPRENE	018	UNK	142.00	24.00	23.		326
				123.00	1.00	23.		326
	NITRILE	019	UNK	275.00	4.00	23.		326
				286.00	24.00	23.		326
				259.00	1.00	23.		326
		020	UNK	252.00	1.00	23.		326
				254.00	24.00	23.		326
				252.00	4.00	23.		326
	PE	042	UNK	8.00	1.00	23.		326
				20.00	24.00	23.		326
				20.00	4.00	23.		326
		076	UNK	4.30	1.00	23.		326
				9.00	4.00	23.		326
				9.00	24.00	23.		326
	POLYURETHANE	050	UNK	< .01	24.00	23.		326
				1.50	4.00	23.		326
				.30	1.00	23.		326
	PV ALCOHOL	102	UNK	.30	1.00	23.		326
				1.50	4.00	23.		326
				1.00	24.00	23.		326
	PVC	077	UNK	> 1,000.00	1.00	23.		326
	TEFLON	036	UNK	< .01	24.00	23.		326
				< .01	1.00	23.		326
				< .01	4.00	23.		326
	VITON	009	UNK	9.00	4.00	23.		326
				< .01	1.00	23.		326
				11.00	24.00	23.		326
Methyl Chloroform (Trichloroethane,1,1,1)								
000715560	BUTYL	014	UNK	249.00	1.00	25.		326
				260.00	4.00	25.		326
				263.00	24.00	25.		326
		064	UNK	11.00	1.00	25.		326
				153.00	4.00	25.		326
				181.00	24.00	25.		326
	NATURAL RUBBER	017	UNK	334.00	1.00	25.		326
				429.00	4.00	25.		326
				425.00	24.00	25.		326
	NEOPRENE	018	UNK	213.00	1.00	25.		326
				239.00	4.00	25.		326
				246.00	24.00	25.		326
	NITRILE	019	UNK	182.00	1.00	25.		326
				208.00	4.00	25.		326
				214.00	24.00	25.		326
	PE	042	UNK	9.60	1.00	25.		326
				9.60	4.00	25.		326
				9.60	24.00	25.		326
		076	UNK	-5.00	1.00	25.		326
				13.30	4.00	25.		326
				12.30	24.00	25.		326
	POLYURETHANE	050	UNK	14.30	1.00	25.		326
				15.70	4.00	25.		326
				13.70	24.00	25.		326

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION SWELLING TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	SWELL (PERCENT VOLUME)	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000715560	PV ALCOHOL	102	UNK	< .01	1.00	25.		326
				3.00	4.00	25.		326
				4.00	24.00	25.		326
	PVC	077	UNK	< .01	1.00	25.		326
				< .01	4.00	25.		326
				22.00	24.00	25.		326
	TEFLON	036	UNK	< .01	1.00	25.		326
				< .01	4.00	25.		326
				< .01	24.00	25.		326
	VITON	009	UNK	< .01	1.00	25.		326
				8.60	4.00	25.		326
				20.50	24.00	25.		326
Polychlorinated Biphenyls (PCBs) (Aroclor)								
013363630	BUTYL	014	118	14.00	24.00	23.		290
	NATURAL RUBBER	017	UNK	200.00	24.00	23.		290
	NEOPRENE	018	100	10.00	24.00	23.		290
	PE	006	100	35.00	24.00	23.		290
	PV ALCOHOL	102	100	4.00	24.00	23.		290
Tetrachloroethylene (Perchloroethylene)								
001271840	BUTYL	014	118	280.00	24.00	23.	.04	291
	NATURAL RUBBER	017	UNK	530.00	24.00	23.	.02	291
	NEOPRENE	018	100	320.00	24.00	23.	.04	291
	NITRILE	020	191	60.00	24.00	23.	.04	291
	PE	006	100	85.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	-12.00	24.00	23.	.05	291
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	< .01	24.00	23.	.02	291
1,1,2-Trichloroethane								
000790050	BUTYL	014	UNK	-1.00	24.00	23.		326
				10.00	1.00	23.		326
				7.00	4.00	23.		326
		064	UNK	44.00	24.00	23.		326
				44.00	4.00	23.		326
				42.00	1.00	23.		326
	NATURAL RUBBER	017	UNK	146.00	1.00	23.		326
				154.00	24.00	23.		326
				154.00	4.00	23.		326
	NEOPRENE	018	UNK	158.00	1.00	23.		326
				140.00	4.00	23.		326
				158.00	24.00	23.		326
	NITRILE	019	UNK	355.00	24.00	23.		326
				339.00	4.00	23.		326
				277.00	1.00	23.		326
	PE	042	UNK	-16.00	4.00	23.		326
				-23.00	1.00	23.		326
				-20.00	24.00	23.		326
		076	UNK	-1.00	24.00	23.		326
				4.00	4.00	23.		326
				14.00	1.00	23.		326
	POLYURETHANE	050	UNK	-5.00	4.00	23.		326

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION SWELLING TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	SWELL (PERCENT VOLUME)	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000790050	POLYURETHANE	050	UNK	-5.00	1.00	23.		326
				-5.00	24.00	23.		326
	PV ALCOHOL	102	UNK	5.00	24.00	23.		326
				5.00	4.00	23.		326
				< .01	1.00	23.		326
	PVC	077	UNK	> 1,000.00	1.00	23.		326
	TEFLON	036	UNK	< .01	1.00	23.		326
				< .01	4.00	23.		326
				< .01	24.00	23.		326
	VITON	009	UNK	16.00	4.00	23.		326
				16.00	1.00	23.		326
				19.00	24.00	23.		326
Trichloroethylene (Trichloroethene)								
000790160	BUTYL	014	118	320.00	24.00	23.	.04	291
	NATURAL RUBBER	017	UNK	580.00	24.00	23.	.02	291
	NEOPRENE	018	100	410.00	24.00	23.	.04	291
	NITRILE	020	503	220.00	24.00	23.	.04	291
	PE	006	100	70.00	24.00	23.	.01	291
	PV ALCOHOL	102	100	-10.00	24.00	23.	.05	291
	TEFLON	036	214	< .01	24.00	23.	.01	291
	VITON	009	118	20.00	24.00	23.	.02	291

APPENDIX D

DIFFUSION COEFFICIENTS

SUMMARY OF PERFORMANCE DETAIL TESTS
DIFFUSION COEFFICIENTS

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	DIFFUSION COEFFICIENT CM**2/SEC a	b	TEMP DEG C	THICKNESS CM	REF NUM
Acetone								
000676410	PV ACETATE	124	UNK	1.30	-11.00	40.		178
Allyl Chloride								
001070510	PV ACETATE	124	UNK	1.30	-11.00	40.		178
Benzene								
000714320	BUTYL	014	UNK	4.33	-8.00	23.		327
		064	UNK	5.30	-7.00	23.		327
	EVA	074	UNK	1.90	-6.00	23.		327
	NATURAL RUBBER	017	UNK	1.45	-6.00	23.		327
				1.60	-5.00	23.		327
		045	UNK	1.50	-7.00	25.		225
	NEOPRENE	018	UNK	5.70	-7.00	23.		327
	NITRILE	019	UNK	3.50	-7.00	23.		327
	NONWOVEN PE	071	UNK	1.13	-6.00	23.		327
	PE	042	UNK	8.33	-9.00	23.		327
		048	UNK	1.90	-9.00	0.		253
		076	UNK	8.80	-7.00	23.		327
	PV ACETATE	124	UNK	4.80	-13.00	40.		178
	PV ALCOHOL	004	UNK	7.30	-7.00	23.		327
	PVC	003	UNK	4.50	-7.00	23.		327
	SARANEX	061	UNK	1.67	-8.00	23.		327
	TEFLON	036	UNK	6.77	-9.00	23.		327
	VITON	009	UNK	6.00	-8.00	23.		327
Butyl Cellosolve (Butoxyethanol, 2)								
001117620	NITRILE	019	100	3.45	-7.00	37.	.06	107
				2.57	-7.00	37.	.06	107
	PVC	007	129	7.00	-7.00	22.		122
Carbon Tetrachloride (Tetrachloromethane)								
000562350	PV ACETATE	124	UNK	3.00	-16.00	40.		178
Chlorobenzene								
001089070	NEOPRENE	002	UNK	6.61	-5.00	23.		186
	PVC	007	UNK	7.36	-5.00	23.		186
Dimethyl Sulfoxide								
000676850	NEOPRENE	002	UNK	6.60	-4.00	23.		186
Ethane								
000748400	PE	048	UNK	8.15	-8.00	25.		193
Ethylene Dichloride (Dichloroethane,1,2)								
001070620	BUTYL	014	UNK	6.23	-8.00	23.		326
		064	UNK	5.83	-8.00	23.		326
	NATURAL RUBBER	017	UNK	7.50	-7.00	23.		326
	NEOPRENE	018	UNK	4.67	-7.00	23.		326
	NITRILE	019	UNK	4.50	-7.00	23.		326
		020	UNK	1.00	-6.00	23.		326
	PE	042	UNK	3.33	-8.00	23.		326

SUMMARY OF PERFORMANCE DETAIL TESTS
DIFFUSION COEFFICIENTS

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	DIFFUSION COEFFICIENT CM**2/SEC a		b	TEMP DEG C	THICKNESS CM	REF NUM
001070620	PV ALCOHOL	102	UNK		1.83	-7.00	23.		326
	TEFLON	036	UNK	<	5.00	-8.00	23.		326
		044	UNK		8.33	-10.00	23.		326
	VITON	009	UNK	<	8.33	-11.00	23.		326
Hexane									
001105430	NEOPRENE	002	UNK		1.35	-5.00	23.		186
	PE	041	UNK		7.50	-11.00	0.		253
		042	UNK		1.50	-10.00	0.		253
		048	UNK		1.20	-9.00	0.		253
					2.50	-8.00	30.		253
	PVC	007	UNK		3.68	-5.00	23.		186
Isobutylene (Isobutene)									
001151170	PE	048	UNK		4.70	-8.00	30.		253
					3.10	-9.00	0.		253
					1.25	-9.00	-8.		253
Isopropylamine									
000753100	PV ACETATE	124	UNK		1.70	-12.00	40.		178
Methane									
000748280	PE	048	UNK		1.96	-7.00	25.		193
Methanol (Methyl Alcohol)									
000675610	PV ACETATE	124	UNK		1.40	-9.00	40.		178
	PVC	007	UNK		1.51	-5.00	23.		186
Methyl Bromide (Bromomethane)									
000748390	PE	041	UNK		1.40	-9.00	0.		253
		042	UNK		2.90	-8.00	0.		253
		048	UNK	7.30 -	10.00	-9.00	0.		253
					8.30	-8.00	30.		253
Methyl Chloroform (Trichloroethane,1,1,1)									
000715560	BUTYL	014	UNK		1.45	-7.00	25.		326
		064	UNK		1.67	-7.00	25.		326
	NATURAL RUBBER	017	UNK		2.78	-7.00	25.		326
	NEOPRENE	018	UNK		2.08	-7.00	25.		326
	NITRILE	019	UNK		3.67	-8.00	25.		326
	PE	042	UNK		2.33	-8.00	25.		326
		076	UNK		3.83	-8.00	25.		326
	POLYURETHANE	050	UNK		1.38	-7.00	25.		326
	PVC	077	UNK		6.33	-7.00	25.		326
	VITON	009	UNK	<	1.17	-9.00	25.		326
Propane									
000749860	PE	048	UNK		2.00	-8.00	25.		193
Propyl Alcohol (Propanol)									
000712380	PV ACETATE	124	UNK		1.10	-12.00	40.		178
n-Propylamine									

SUMMARY OF PERFORMANCE DETAIL TESTS
DIFFUSION COEFFICIENTS

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	DIFFUSION COEFFICIENT CM**2/SEC a		b	TEMP DEG C	THICKNESS CM	REF NUM
001071080	PV ACETATE	124	UNK		5.10	-12.00	40.		178
Propyl Chloride (Chloropropane, 1)									
005405450	PV ACETATE	124	UNK		1.30	-12.00	40.		178
Toluene									
001088830	BUTYL	014	118		3.67	-7.00	22.		122
			216		1.02	-6.00	37.		122
	NEOPRENE	002	UNK		5.56	-5.00	23.		186
		018	509		6.17	-7.00	22.		122
	NITRILE	019	100		3.45	-7.00	37.	.06	122
					2.57	-7.00	37.	.06	122
					1.50	-7.00	22.		122
					2.95	-7.00	37.	.04	122
			118		1.17	-7.00	22.		122
					4.15	-7.00	37.		122
					1.67	-7.00	22.		122
			509		2.67	-7.00	22.		122
		020	216		3.50	-7.00	22.		122
					6.95	-7.00	37.		122
					5.17	-7.00	22.		122
	PVC	003	215		5.50	-7.00	22.		122
		007	129		3.33	-7.00	22.		122
					3.27	-7.00	37.		122
			UNK		8.10	-5.00	23.		186
	VITON	009	118		2.33	-8.00	37.		122
	VITON/NEOPRENE	022	216		3.33	-8.00	22.		122
					5.17	-8.00	37.		122
1,1,2-Trichloroethane									
000790050	BUTYL	014	UNK		1.67	-7.00	23.		326
		064	UNK		8.33	-8.00	23.		326
	NATURAL RUBBER	017	UNK		1.47	-6.00	23.		326
	NEOPRENE	018	UNK		1.35	-6.00	23.		326
	NITRILE	019	UNK		5.50	-7.00	23.		326
	PE	042	UNK		2.00	-8.00	23.		326
	POLYURETHANE	050	UNK	>	2.83	-7.00	23.		326
	PV ALCOHOL	102	UNK		2.67	-7.00	23.		326
	TEFLON	036	UNK	<	4.83	-11.00	23.		326
		044	UNK		4.00	-10.00	23.		326
	VITON	009	UNK	<	1.20	-9.00	23.		326
Trichloroethylene (Trichloroethene)									
000790160	NEOPRENE	002	UNK		5.03	-5.00	23.		186
	PVC	007	UNK		1.45	-6.00	23.		186

APPENDIX E

TENSILE DATA

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION TENSILE STRENGTH CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT TENSILE CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
1,1-Dimethylhydrazine (Dimethylhydrazine,unsym-)								
000571470	BUTYL	064	113	< .01	.08	23.		321
		085	211	-13.64	.08	23.		321
	CHLOROBUTYL	052	205	< .01	.08	23.		321
	CPE	060	113	-20.63	.08	23.		321
		070	113	-10.00	.08	23.		321
	PVC	053	126	29.03	.08	23.		321
	TEFLON	055	210	85.19	.08	23.		321
Freon TMC								
577623190	BUTYL	064	113	6.82	.08	23.		321
		085	211	2.27	.08	23.		321
	CHLOROBUTYL	052	205	8.38	.08	23.		321
	CPE	060	113	-12.70	.08	23.		321
		070	113	-20.00	.08	23.		321
	PVC	053	126	16.13	.08	23.		321
	TEFLON	055	210	48.15	.08	23.		321
Hydrazine (Diamine)								
003020120	BUTYL	064	113	-25.00	.08	23.		321
		085	211	-15.91	.08	23.		321
	CHLOROBUTYL	052	205	-2.78	.08	23.		321
	CPE	060	113	< .01	.08	23.		321
		070	113	-15.00	.08	23.		321
	PVC	053	126	9.68	.08	23.		321
	TEFLON	055	210	166.67	.08	23.		321
Hydrochloric Acid								
076470100	BUTYL	064	113	15.91	.08	23.		321
		085	211	-4.55	.08	23.		321
	CHLOROBUTYL	052	205	-13.89	.08	23.		321
	CPE	060	113	-11.11	.08	23.		321
		070	113	-62.50	.08	23.		321
	PVC	053	126	35.48	.08	23.		321
	TEFLON	055	210	174.07	.08	23.		321
Hydrogen Peroxide								
077228410	BUTYL	064	113	36.36	.08	23.		321
		085	211	-4.55	.08	23.		321
	CPE	060	113	-9.52	.08	23.		321
		070	113	-45.00	.08	23.		321
	PVC	053	126	35.48	.08	23.		321
	TEFLON	055	210	29.63	.08	23.		321
Hydrogen Peroxide, <30%								
077228411	CHLOROBUTYL	052	205	2.78	.08	23.		321
Isopropyl Alcohol (Propanol, 2-)								
000676300	BUTYL	064	113	-2.27	.08	23.		321
		085	211	< .01	.08	23.		321
	CHLOROBUTYL	052	205	-6.94	.08	23.		321
	CPE	060	113	-1.59	.08	23.		321

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION TENSILE STRENGTH CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT TENSILE CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
000676300	CPE	070	113	-10.00	.08	23.		321
	PVC	053	126	12.90	.08	23.		321
	TEFLON	055	210	129.63	.08	23.		321
Methyl Ethyl Ketone (Butanone,2)								
000789330	BUTYL	064	113	6.82	.08	23.		321
		085	211	-4.55	.08	23.		321
	CHLOROBUTYL	052	205	5.56	.08	23.		321
	CPE	060	113	-4.76	.08	23.		321
		070	113	-20.00	.08	23.		321
	PVC	053	126	-67.74	.08	23.		321
	TEFLON	055	210	159.26	.08	23.		321
Methylhydrazine								
000603440	BUTYL	064	113	-4.55	.08	23.		321
		085	211	-4.55	.08	23.		321
	CHLOROBUTYL	052	205	-11.11	.08	23.		321
	CPE	060	113	-7.94	.08	23.		321
		070	113	-12.50	.08	23.		321
	PVC	053	126	-22.58	.08	23.		321
	TEFLON	055	210	85.19	.08	23.		321
Nitric Acid								
076973720	BUTYL	064	113	2.27	.08	23.		321
		085	211	4.55	.08	23.		321
	CHLOROBUTYL	052	205	-27.78	.08	23.		321
	CPE	060	113	1.59	.08	23.		321
		070	113	-40.00	.08	23.		321
	PVC	053	126	-16.13	.08	23.		321
	TEFLON	055	210	133.33	.08	23.		321
Nitric Acid, Fuming Red								
080075870	BUTYL	064	113	25.00	.08	23.		321
		085	211	-6.82	.08	23.		321
	CHLOROBUTYL	052	205	-19.44	.08	23.		321
	CPE	060	113	3.17	.08	23.		321
		070	113	-62.50	.08	23.		321
	PVC	053	126	16.13	.08	23.		321
	TEFLON	055	210	44.44	.08	23.		321
Nitrogen Tetroxide								
105447260	BUTYL	064	113	36.36	.08	23.		321
		085	211	-20.45	.08	23.		321
	CHLOROBUTYL	052	205	-47.22	.08	23.		321
	CPE	060	113	-26.98	.08	23.		321
		070	113	-52.50	.08	23.		321
	PVC	053	126	-19.35	.08	23.		321
	TEFLON	055	210	207.41	.08	23.		321
Sulfuric Acid								
076649390	BUTYL	064	113	2.27	.08	23.		321
		085	211	-9.09	.08	23.		321
	CHLOROBUTYL	052	205	-5.56	.08	23.		321

SUMMARY OF PERFORMANCE DETAIL TESTS
IMMERSION TENSILE STRENGTH CHANGE TEST

CHEMICAL NAME/ CASNO	RESISTANT MATERIAL	PRODUCT DESC CODE	VENDOR	PERCENT TENSILE CHANGE	IMMERSION TIME HOURS	TEMP DEG C	THICKNESS CM	REF NUM
076649390	CPE	060	113	6.35	.08	23.		321
		070	113	-22.50	.08	23.		321
	PVC	053	126	< .01	.08	23.		321
	TEFLON	055	210	92.59	.08	23.		321

APPENDIX F

PERMEATION DATA FOR MULTI-COMPONENT LIQUIDS

CROSS-REFERENCE OF CHEMICALS IN MIXTURES

COMPONENT	MIXTURE
Acetone	
000676410	000400029
	000400079
	000400169
	000400179
	000400189
	000400199
	000400209
	000400219
	000400229
Acetonitrile	
000750580	000400059
Atlox 3403F	
000300060	000400389
	000400399
Atlox 3404F	
000300070	000400389
	000400399
Butadiene	
001069900	000400059
Butyl Acetate	
001238640	000400089
	000400109
Butyl Alcohol	
000713630	000400089
	000400109
Cyclohexanol	
001089300	000400359
	000400369
	000400379
Diesel Oil	
000300020	000400149
Epoxy Resin	
000300010	000400079
	000400099
Ethyl Acetate	
001417860	000400019
	000400029
	000400109

CROSS-REFERENCE OF CHEMICALS IN MIXTURES

COMPONENT	MIXTURE
Ethyl Alcohol	
000641750	000400019
	000400029
	000400039
	000400089
	000400299
	000400309
	000400319
	000400329
	000400339
	000400349
	000400359
	000400369
	000400379
Ethylene Glycol Monoacetate	
005245960	000400069
Hexane	
001105430	000400169
	000400179
	000400189
	000400199
	000400209
	000400219
	000400229
	000400239
Isobutyl Alcohol	
000788310	000400049
Isopropyl Alcohol	
000676300	000400049
	000400059
	000400069
Methanol	
000675610	000400029
	000400109
Methyl Acetate	
000792090	000400039
Methyl Cellosolve	
001098640	000400079
Methylene Chloride	
000750920	000400139
	000400239
	000400249

CROSS-REFERENCE OF CHEMICALS IN MIXTURES

COMPONENT	MIXTURE
Methyl Ethyl Ketone	
000789330	000400059
	000400069
	000400089
Methyl Isobutyl Ketone	
001081010	000400049
	000400059
	000400069
	000400099
	000400119
	000400129
Methyl Parathion	
002980000	000400389
	000400399
Nitrobenzene	
000989530	000400329
	000400339
	000400349
Organophosphate	
000300030	000400159
Pentachlorophenol	
000878650	000400149
Phenol	
001089520	000400139
Polyamide	
000300000	000400049
Propylene Glycol	
000575560	000400159
Sodium Hydroxide	
013107320	000400289
Sodium Pentachlorophenate	
001315220	000400289
Tenneco 500-100	
000300050	000400389
	000400399

CROSS-REFERENCE OF CHEMICALS IN MIXTURES

COMPONENT	MIXTURE
Toluene	
001088830	000400049
	000400089
	000400099
	000400109
	000400119
	000400249
Water	
077321850	000400389
Xylene	
001332070	000400089
	000400099
	000400129
	000400299
	000400309
	000400319

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400019 REFERENCE: 124

001417860	> 70% by vol	Ethyl Acetate
000641750		Ethyl Alcohol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400019	014	21.00	> 4.00		.07
PV ALCOHOL					
000400019	004	21.00	> 4.00		
PVC					
000400019	003	21.00	.03	1,102.20	.05
VITON/NEOPRENE					
000400019	022	21.00	.13	280.56	.05

MIXTURE: 000400029 REFERENCE: 124

001417860	> 70% by vol	Ethyl Acetate
000676410		Acetone
000641750		Ethyl Alcohol
000675610		Methanol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400029	014	21.00	> 4.00		.07
PV ALCOHOL					
000400029	004	21.00	> 4.00		

MIXTURE: 000400039 REFERENCE: 124

000792090	50% by vol	Methyl Acetate
000641750	50% by vol	Ethyl Alcohol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400039	014	21.00	> 4.00		.04
NITRILE					
000400039	019	21.00	.12	105.21	.03
VITON					
000400039	009	21.00	.07	62.29	.03

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400049 REFERENCE: 124

000788310	30 - 70% by vol	Isobutyl Alcohol
000676300	< 30% by vol	Isopropyl Alcohol
001081010	< 30% by vol	Methyl Isobutyl Ketone
001088830	< 30% by vol	Toluene
000300000		Polyamide

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
PV ALCOHOL					
000400049	004	21.00	> 4.00		

MIXTURE: 000400059 REFERENCE: 124

000789330	30 - 70% by vol	Methyl Ethyl Ketone
001081010	< 30% by vol	Methyl Isobutyl Ketone
000676300	< 30% by vol	Isopropyl Alcohol
001069900		Butadiene
000750580		Acetonitrile

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400059	014	21.00	> 4.00		
NITRILE					
000400059	019	21.00	.32	260.52	.04
PVC					
000400059	003	21.00	.15		

MIXTURE: 000400069 REFERENCE: 124

000789330	30 - 70% by vol	Methyl Ethyl Ketone
005245960	30 - 70% by vol	Ethylene Glycol Monoacetate
001081010	< 30% by vol	Methyl Isobutyl Ketone
000676300	< 30% by vol	Isopropyl Alcohol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400069	014	21.00	> 4.00		.07
NATURAL RUBBER					
000400069	017	21.00	.33	24.05	.05

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400079 REFERENCE: 124

000676410	< 30% by vol	Acetone
001098640	30% by vol	Methyl Cellosolve
000300010		Epoxy Resin

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400079	014	21.00	> 4.00		.07
PV ALCOHOL					
000400079	004	21.00	> 4.00		
PVC					
000400079	003	21.00	.02	1,490.98	.05

MIXTURE: 000400089 REFERENCE: 124

001088830	5 - 20% by vol	Toluene
000713630	5 - 20% by vol	Butyl Alcohol
001238640	5 - 20% by vol	Butyl Acetate
000641750	5 - 20% by vol	Ethyl Alcohol
000789330	5 - 20% by vol	Methyl Ethyl Ketone
001332070	5 - 20% by vol	Xylene

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
BUTYL					
000400089	014	21.00	2.65	6.61	.04
NITRILE					
000400089	019	21.00	.10	916.83	.04
000400089	020	21.00	.23	842.68	.04
PE/EVOH/PE					
000400089	109	21.00	.43	410.82	.06
PV ALCOHOL					
000400089	004	21.00	> 4.00		
PVC					
000400089	003	21.00	.07	855.71	.06
VITON					
000400089	009	21.00	.08	671.34	.03

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400099 REFERENCE: 124

001088830	30 - 70% by vol	Toluene
001081010	< 30% by vol	Methyl Isobutyl Ketone
001332070	< 30% by vol	Xylene
000300010		Epoxy Resin

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
PV ALCOHOL					
000400099	004	21.00	> 4.00		

MIXTURE: 000400109 REFERENCE: 124

001088830	30 - 70% by vol	Toluene
000713630		Butyl Alcohol
001238640		Butyl Acetate
001417860		Ethyl Acetate
000675610		Methanol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
PV ALCOHOL					
000400109	004	21.00	.43	42.08	
VITON/NEOPRENE					
000400109	022	21.00	.27	300.60	.05

MIXTURE: 000400119 REFERENCE: 124

001088830	50% by vol	Toluene
001081010	50% by vol	Methyl Isobutyl Ketone

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
PV ALCOHOL					
000400119	004	21.00	> 4.00		

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400129 REFERENCE: 124

001332070	50% by vol	Xylene
001081010	50% by vol	Methyl Isobutyl Ketone

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
NITRILE					
000400129	019	21.00	.20	2,705.40	.03
VITON					
000400129	009	21.00	.33	3,006.00	.03

MIXTURE: 000400139 REFERENCE: 124

000750920	> 70% by vol	Methylene Chloride
001089520		Phenol

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
NEOPRENE					
000400139	018	21.00	.30	1.34	.11
PV ALCOHOL					
000400139	004	21.00	> 4.00		

MIXTURE: 000400149 REFERENCE: 278

000878650	4% by vol	Pentachlorophenol
000300020		Diesel Oil

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
NATURAL RUBBER					
000400149	001	23.00	.01	.02	.16
NEOPRENE					
000400149	018	23.00	1.00	1.35	.04
NITRILE					
000400149	019	23.00	> 8.00		.06
PVC					
000400149	003	23.00	.01	.27	.02

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400169 REFERENCE: 302

000676410	95% by vol	Acetone
001105430	5% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.08		.04
001105430	112	25.00	.08		.04

MIXTURE: 000400179 REFERENCE: 302

000676410	86% by vol	Acetone
001105430	14% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.10		.04
001105430	112	25.00	.10 - .18		.04

MIXTURE: 000400189 REFERENCE: 302

000676410	50% by vol	Acetone
001105430	50% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.03 - .10		.04
001105430	112	25.00	.03 - .10		.04

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400199 REFERENCE: 302

000676410	35% by vol	Acetone
001105430	65% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.10		.04
001105430	112	25.00	.10		.04

MIXTURE: 000400209 REFERENCE: 302

000676410	15% by vol	Acetone
001105430	85% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.10 - .18		.04
001105430	112	25.00	.10 - .18		.04

MIXTURE: 000400219 REFERENCE: 302

000676410	5% by vol	Acetone
001105430	95% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.08		.04
001105430	112	25.00	.08		.04

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400229 REFERENCE: 302

000676410	1% by vol	Acetone
001105430	99% by vol	Hexane

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000676410	112	25.00	.08		.04
001105430	112	25.00	.08		.04

MIXTURE: 000400239 REFERENCE: 302

001105430	50% by vol	Hexane
000750920	50% by vol	Methylene Chloride

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000750920	112	25.00	.70 - .78		.04
001105430	112	25.00	.95 - 1.03		.04

MIXTURE: 000400249 REFERENCE: 302

000750920	50% by vol	Methylene Chloride
001088830	50% by vol	Toluene

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
VITON/CHLOROBUTYL					
000750920	112	25.00	.75 - .92		.04
001088830	112	25.00	.97 - 1.10		.04

SUMMARY OF PERFORMANCE DETAIL FOR MIXTURE COMPONENTS

MIXTURE: 000400289 REFERENCE: 278

001315220	4% by vol	Sodium Pentachlorophenate
013107320		Sodium Hydroxide

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
NATURAL RUBBER					
000400289	001	23.00	.01	.02	.16
NEOPRENE					
000400289	018	23.00	> 7.50		.04
NITRILE					
000400289	019	23.00	> 15.50		.06
PVC					
000400289	003	23.00	> 5.00		.02
000400289	007	23.00	> 15.50		.11

MIXTURE: 000400389 REFERENCE: 104

002980000	10% by wt	Methyl Parathion
000300050	6% by wt	Tenneco 500-100
000300060		Atlox 3403F
000300070		Atlox 3404F
077321850	83% by wt	Water

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
NONWOVEN PE					
002980000	071	23.00	< .08	20.04 - 60.12	
PE					
002980000	076	23.00	.50 - .75	.20	

MIXTURE: 000400399 REFERENCE: 104

002980000	57% by wt	Methyl Parathion
000300050	36% by wt	Tenneco 500-100
000300060	5% by wt	Atlox 3403F
000300070	2% by wt	Atlox 3404F

	PROD CODE	TEMP (C)	BREAKTHROUGH (HOURS)	PERMEATION RATE (UG/CM^2/MIN)	THICK (CM)
PE					
002980000	076	23.00	.25	.08	
SARANEX					
002980000	061	23.00	2.00 - 3.00	.02	

APPENDIX G

VENDOR CODES FOR USE WITH DATA SUMMARIES IN APPENDICES A THROUGH E

VENDOR CODES FOUND IN APPENDICES A THROUGH E

VENDOR CODE	VENDOR NAME
100	Edmont Div. Becton, Dickinson & Co.
101	Granet
102	Ansell Industrial Products
103	Best Manufacturing Company
104	Boss Manufacturing Company
106	Disposables Inc.
107	Durafab Disposables, Inc.
108	Keystone Protection Corp.
110	Glover Latex, Inc.
112	Greene Rubber Co., Inc.
113	ILC Dover
114	International Playtex, Inc.
115	Major Safety Service, Inc.
116	Melco, Inc.
117	Mine Safety Appliances Co.
118	North Hand Protection
119	OKI Supply Co.
120	Pioneer Industrial Products Co.
121	Plastex Protective Products, Inc.
122	PPG Industries, Inc.
123	Protexall Company
124	Safety First Industries
125	SGL Homalite Industries
126	Wheeler Protective Apparel, Inc.
127	E.I. du Pont de Nemours & Co., Inc.
128	Jordan David Safety Products
129	KID AB
140	Allied Glove & Safety Products Corp.
141	The Sager Corporation
142	American Scientific Products
144	Arbill Inc.
145	Body-Guard
146	Cesco Safety Products
147	Charkate
150	Dayton Flexible Products
151	Defense Apparel
153	Direct Safety Company
155	Eastco Industrial Safety Corp.
156	Encon Manufacturing Co.
157	Fairway Products
158	General Scientific Safety Equipment Company
159	Frommelt Industries, Inc.
160	Goodyear Rubber Products Corp.
162	Holcomb Safety Garment Co.
164	Industrial Products Co., Inc.
165	Industrial Safety and Security Co.
166	Interex Corp.
168	Jomac Products Inc.
169	Kappler Disposables, Inc.
170	Kimberly-Clark Corp.
172	Lehigh Safety Shoe Co.

VENDOR CODES FOUND IN APPENDICES A THROUGH E

VENDOR CODE	VENDOR NAME
173	Magid Glove and Safety Mfg. Co.
174	Neese Industries Inc.
175	Pendergast Safety Equipment Co.
176	Plastimayd Corp.
177	Pulmosan Safety Equipment Corp.
178	Rainfair, Inc.
179	Ranger
180	Record Industrial Co.
181	Renco Corp
185	W.H. Salisbury & Co.
187	Singer Safety Co.
188	Standard Glove & Safety Equip. Corp.
189	Standard Safety Equipment Co.
191	LRC Safety Products Co.
192	H. Texier Glove Company Inc.
193	Tingley Rubber Corp.
194	The Tracies Co.
196	United States Safety Service Co.
197	Angelica Uniform Group
198	Vidaro Corp.
201	Falcon Industries, Inc.
202	Oak Medical Supply Co.
203	Colonial Glove & Garment Inc.
204	Monte Glove Company
205	Arrowhead Products
206	Hub Safety Equipment, Inc.
207	Miller Products Co., Inc.
208	Robar Protective Products
209	Fisher Scientific Company
210	Comasec
211	Barry Manufacturing Co. Ltd.
212	Rich Industries
214	Clean Room Products, Inc.
215	Vinylprodukter
216	Erista
220	National Draeger, Inc.
223	Bel-Art Products
225	Coyne Safety Equipment, Inc.
227	Halprin Supply Co.
229	Inco Safety Products Co.
231	Keller Glove Mfg. Co.
232	Latex Glove Co., Inc
233	Leonard Safety Epuipment, Inc.
234	Lion Uniform, Inc.
235	Mar-Mac Manufacturing Co., Inc.
236	National Safety Wear, Inc.
238	Rockford Medical & Safety Co.
239	Safety Engineering & Supply Co.
242	3M Company
244	Intermarket Latex, Inc.
245	Protech Safety Equipment Inc.

VENDOR CODES FOUND IN APPENDICES A THROUGH E

VENDOR CODE	VENDOR NAME
246	Broner Glove Co.
247	Trelleborg, Inc.
248	Masterman's
249	Goodall Rubber Company
500	Oak Technical, Inc.
501	Bard Parker
502	Seiberling
503	Surety-Sure Seal
504	California Safety
505	Handgards Inc.
506	Ackwell
507	Converse Inc.
508	Pharmaseal Laboratories Inc.
509	Nolato
510	Chemical Fabrics Corporation
511	Dow Chemical Company
512	Lab Safety Supply Company
513	Andover Industries, Inc.
514	Acme Mills Company
515	E.D. Bullard Company
516	Cofish International, Inc.
517	Dorsey Safety Products Co.
518	Elliott Glove Company, Inc.
519	Exxon Chemical Company
520	Fyrepel Products Inc.
521	Hy-Test Safety Shoes
522	Iron Age Protective Company
523	La Crosse Footwear, Inc.
524	Panelgraphic Corporation
525	Shelby-Wolverine Glove Company
526	Steele & Associates, Inc.
527	Steel Grip Safety Apparel Co., Inc.
529	United States Plastic Corp.
531	Superior Surgical Mfg. Co., Inc.
532	Willson Safety Products
534	Daffin Disposables, Inc.
535	Aramsco
536	Alliance Supply, Inc.
537	Holland Safety Supply Co.
538	Memphis Glove Company
539	Jones Safety Supply, Inc.
540	Ronco Textile Products, Inc.
541	Safeco Inc.
542	Armin Corporation
543	IPESCo., Inc.
544	Marathon Rubber
545	Stauffer Manufacturing Company
547	Sawyer-Tower
548	E.I. du Pont de Nemours & Company

APPENDIX H

RATIONALE FOR RECOMMENDATIONS IN MATRIX A

1. Overview

CPC chemical resistance information was formed into two data bases:

- Test data including breakthrough times, permeation rates, percent swell, percent elongation, percent weight change and calculated diffusion coefficients from the technical literature and CPC vendors.

- Qualitative ratings (e.g., "excellent," "good," etc.) from CPC vendors, raw materials suppliers and a variety of publications.

There was a separate field for each test and each qualitative rating for each chemical/material pair. The total number of fields was about 10,000.

Algorithms were developed to analyze the information in each data base separately. The results of the analyses were then combined by means of another algorithm to produce the recommendations in Matrix A. The algorithms for each analysis are summarized in the following paragraphs.

2. Test Data

Five types of data were considered: breakthrough time, % swell (volume), % change in elongation, % change in weight due to immersion, and diffusion coefficient. The data were scanned and classified as follows:

Breakthrough Time	Good >1 hour Fair 0.2-1 hour Poor <0.2 hour
% Swell (Volume)	Good <10% Poor >10%
% Elongation Change	Good <20% Poor >20%
% Weight Change	Good <10% Poor >10%
Diffusion Coefficient	Good $<10^{-10}$ cm^2/sec Poor $>10^{-10}$ cm^2/sec
Tensile Strength	Good <10% Poor >10%

On a resistant material by resistant material basis for each chemical, the number of individual products in each classification was totaled. (See Appendix E of Volume I for a listing of the resistant materials.)

The totals in each classification were compared and the resistant material put into one of the following four groups:

I. Significant number of test data indicating excellent resistance to the particular chemical.

II. Relatively few test data showing excellent resistant, or many data indicating good resistance.

III. Many data indicating fair resistance, or a few data indicating poor resistance.

IV. Significant number of test data indicating poor resistance.

The criteria for Group I were at least two tests with breakthrough times greater than 1 hour; no breakthrough times less than 1 hour and no data indicating "poor" resistance in either swelling, weight change, elongation, or diffusion coefficient.

The criterion for Group II was one or more "good" and no "fair" or "poor" in any of the five tests. Alternatively, the material would be put in Group II if there were two breakthrough times greater than 1 hour (with none less than 1 hour) and two or less "poor" in the other four tests.

The criterion for Group III was one or more "fair" or "poor" test results.

The criteria for Group IV were one or more breakthrough times less than 0.2 hour or two breakthrough times less than 1 hour.

3. Qualitative Information

As described in Volume I, Chapter 7, Part 4, qualitative information was normalized to a four grade scale: A, B, C, D. "A" represented excellent resistance and "D" represented poor resistance. Similar to the test data base, the qualitative information was analyzed on a resistant material by resistant material basis for each chemical. The number of ratings in each grade were tabulated and compared in order to assign each chemical/material pair to one of four groups with descriptions analogous to these given above for the test data. In this case, however, qualitative rather than quantitative information is of concern.

The criteria for Group II were less than three A or B ratings and no C or D ratings. Alternatively, Group II conditions would be met by a total of three or more A or B or C ratings, the number of A plus B ratings greater than the number of C ratings, and no D ratings.

The criteria for Group III were less than a total of three C or D ratings or, alternatively, a total of three or more B, C or D ratings with the number of C plus D ratings greater than the number of B ratings.

The criterion for Group IV was a total of three or more C and D ratings.

4. Matrix A Recommendations

The results of the activities described in the two preceding sections were combined to yield the overall recommendations listed in Matrix A of Volume I. The rationale for the combination is described in Volume I, Chapter 7, Part B.

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